JOURNAL OF GAS LIGHTING, WATER SUPPLY, &c.

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VOL. LXXX., No. 2051.—TUESDAY, SEPTEMBER 2, 1902.

EDITORIAL NOTES.

Trades Unionists in Congress.

THE Trades Union Congress is meeting this week in the Holborn Town Hall—the only previous London gathering of the Unions having been held twenty-one years ago. The facts are sufficiently striking to attract public attention; and, consequently, the newspapers have discussed them in various aspects, according to their lights and predilections. Twenty-one years ago—that is to say, in 1881—Trade Unionism in England had scarcely any politics, and its operations concerned only the members of the Societies and their employers. Its leaders were for the most part men who could remember only too well the kind of trade organization with which the name of Broadhead was identified; and it had been their anxious care for many years to rehabilitate Trade Unionism before the eyes of the law-abiding. The Societies were confined to true and well-defined trades, such as were only followed by artisans who had gone through a regular apprenticeship. The leaders were respectable men of the same handicrafts as their constituents; and their party politics were their own affair. A few eccentric individuals of the order—such as the once notorious Joseph Leicester—preferred to pose as advanced politicians with Republican and International sympathies; but their influence was as small as their numbers were negligible. Time has seen all this changed. The decade of the "eighties" was marked by the irruption of professional socialistic agitators, not usually tradesmen themselves, into some of the more accommodating of the old Societies; but for the most part these Labour politicians, as they called themselves, busied themselves in getting together organizations of their own, with a membership composed of unskilled workers or labourers. This was the "New Unionism."

The old Unions were all Friendly Societies; whereas the new ones ostentatiously disclaimed by their spokesmen (the professional agitators aforesaid) any responsibility of the kind. They proclaimed themselves as "fighting organizations pure and simple;" and their weapon was the "strike," which was used on the smallest provocation, or none at all. With this fresh development of Trade Unionism, the whole community, and not merely the employers, had to reckon. It was a revival in another form of the lawlessness and class tyranny which, about a generation earlier, had terrorized the Sheffield trades. History duly repeated itself. A vast ramification of underground plotting went on unnoticed and unchecked by the powers of law and order, until the impatience of the men who became tired of paying for nothing, and the vanity and folly of the self-appointed wielders of the new industrial force, precipitated a conflict which could only have one issue. What was distinctively new in the New Unionism suffered many blows and much discouragement. Still, its influence profoundly affected the whole course of trade organization; and a political cast came over all the Societies.

The Trades Union Congress of the present year is, therefore, as much a political gathering as it is anything. Discovering by painful experience that the law is superior even to mass meetings with brass bands and banners, those who seek to strengthen the power of Trade Unionism in the land are bent upon obtaining influence upon the Legislature with a view to moulding the laws to their own wishes. It is a perfectly constitutional procedure; and there cannot be the slightest objection to the latest movement on the part of the leaders of the forces of Trade Unionism, which is a preparation for a great electoral campaign. As one of the London newspapers gleefully remarks, "at the next general election we may see fifty or sixty Trade Union candidates in the field." So be it. Better a fight with votes than with brickbats. Only, Labour candidates must learn the business of Parliament better than most of them have hitherto exhibited any capacity or desire to do, if they are to become a power in the State. They must be Englishmen and British subjects first of all, if they are to win the suffrages of parliamentary constituencies containing even a strong labour-class element. The British public is a long way from desiring to be ruled, taxed, and rated exclusively for the benefit of any one class of citizens; but this is what the average Labour politician does not comprehend. He is also apt to see in the existing preponderation of men of social standing and private resources in the House of Commons only so many selfish plotters for their own ends; and he deludes himself into believing that if he can but displace a member of this order, he will be able to have his own way. As a humorous philosopher has observed of a different subject, "there is too much Ego in his cosmos;" and the results are consequently disappointing. When the working man realizes himself as a part of his surroundings, and does not blatantly call for everything in which he may be employed to be carried on entirely for his benefit—when even his notion of Socialism is something larger than that of a nostrum for getting more wages for less work—then he will doubtless succeed to greater political power and influence; but it will not be the existing stock company of agitators who will wield them for him.

There is not much encouragement for the hope that this year's Trades Union Congress will exhibit the politics of Labour in a better light, in the circumstance of Sunday being appropriated for a "mass meeting" in Hyde Park to protest against the legal decisions which hold Trade Unions responsible for the actions of their agents. Neither workmen nor any other class or interest in the community can expect to be superior to the law of the land, merely because they would like to be. The working man would be the first to rise "in his thousands" to protest against any attempt on the part of a great public company, such as a railway or gas company, or even a Government Department, to procure statutory exemption from pecuniary liability for the wrongful acts of its servants; and it is a little childish on the part of the Trade Union Managers, who are paid for their services like other employees, to pretend that they ought to be placed in a class apart. Besides, they give themselves into the hands of their enemies when they protest, as they did upon their special banners for Sunday's meeting, that responsibility under the law cripples the "power" of Trade Unions. If this is the truth of the matter, then it is open for those who do not believe in Trade Unions to object that unless these organizations can continue to exist within the four corners of the law of the land, the sooner they are done away with the better. There is no getting away from the dilemma which these Trade Union Managers have prepared for themselves so carefully, and, it may be said, so stupidly. By pretending to an exemption which no other subjects enjoy, they also manifest their sectional selfishness; and it will indeed be a miracle if from such evil ruling principles any good counsels proceed.

Sale of Gas for Power Purposes.

IT has been stated publicly that one of the latest devices of municipal electricity supply partisans, driven to desperation over the refusal of the "load factor" to improve itself as a consequence of limitless service extensions, is to urge the sale of current for power below cost price, in order to force the market for the sale of the energy which must be got rid of somehow. The subject is of great importance to the gas industry, which is thus threatened with unfair competition of a peculiarly galling kind. The encouragement of the use of gas-engines is one of the marks of enlightened gas policy; but in very few places (and nowhere as yet in the United Kingdom) has the ultimate possibility of this policy of encouragement been sounded. In the great majority of towns where the price of gas is so high that a substantial reduction for gas-engines would be necessary to meet the case, those who advocate such a reduction are met with the apparently conclusive objection that the town really has no manufactures to speak of, so that it is not worth while to make a specially favourable rate for gas sold for power purposes. On the other hand, in most industrial centres the

price of gas is already so reasonable that nobody quite sees his way to cutting the rate for the special benefit of local manufacturers. It was given in evidence on the Mond Bill of last year that it was not considered likely in the Birmingham district that a substantial reduction in the prevailing prices of gas, which might be taken as ranging from 1s. 9d. to 2s. 3d. per 1000 cubic feet, would lead to a large extension of its industrial applications.

This conservative feeling on the part of suppliers of gas is probably a mistake. We have called in vain for estimates of what it would really cost an established undertaking to make and supply to one account (chiefly by day all the year round) an additional million cubic feet of gas per annum. Nobody seems to care for questions like this. Roughly speaking, such a new branch business might be done at about half the ordinary retail price. But no one has tried. Meanwhile, the suppliers of electric power are cherishing no such reluctance to move for the obliging of customers. Take the example of Manchester. Although not entitled a "bulk" electricity supply, this undertaking is, in fact, more deserving of the name than any other in existence, representing as it does an outlay of considerably over £1,000,000 sterling. It generates electricity by units rated in thousands of kilowatts, and offers it for power at 1¾d. per kilowatt where the motors are run forty-eight hours per week. Perhaps 3000-horse power is disposed of in this way. According to the accounts, the total cost of electricity is about the same figure, when the investment returns just under 5¾ per cent. Evidently, therefore, this selling price for electric power is cut very fine.

The figures given are of interest as indicating roughly the cost at which the electricity-in-bulk ventures in different parts of the country may be able to send out power to a distance, when they get to work. They will scarcely be able to do it and make both ends meet for much less than 2d. per kilowatt, which is at least double the cost in the case of quite small gas-engines with gas at a reasonable figure. It would be a mistake, however, for administrators of gas undertakings to rely too much on this advantage. What they should consider is the comparative cost and convenience of different sources of power in quantities larger than those for which ordinary gas has been esteemed a cheap enough source. Even cheapness is not everything; and there is an element of convenience and desirability in electric power which is not to be denied. This is not to say that the distant electricity-in-bulk generating undertaking will always have the preference. Where there is much power in demand, 2d. or even 1½d. per kilowatt at the meter is a big charge, against which electric power generated on the premises from gas should easily show an advantage. The greatest drawback to distributed electric power, however, is probably the unavoidable risk of breakdown. If a Corporation, like Manchester, with lighting to do and tramways of its own to work, experiences a partial breakdown, what class of consumers is likely to suffer in the first place? It will be the same with the "bulk" supplies, most of which will have obligations to particular customers, the effect of which might be to leave outsiders very much outside, on an emergency. Of course, a gas service cannot be guaranteed never to fail; but the chances against its doing so are infinitesimal as compared with those operating in respect to any electricity supply. To conclude, we would ask where is the gas undertaking which offers to power customers anything like such closely cut terms as the Manchester 1¾d. per kilowatt? It used to be 1½d., and is so now for tramway traction, which is clearly below cost.

Supposed Discrediting of Strikes by the Working Classes.

In the course of a leading article upon the Board of Trade Annual Report on Changes in Rates of Wages (with which we deal elsewhere), "The Times" of Saturday expressed the opinion that there is ground for believing that, in regard to the relations between employers and employed, there has been a "general growth of a better spirit;" and that "the "discrediting of hot-headed mischief-makers; the spread of "a disbelief in the efficacy of strikes; the presence of a vivid "sense that the real gains to the victor in this form of civil "war are rarely worth the cost; the belief that a strike is "generally due to temper or want of tact in one or more "persons"—are "important" factors in the present situation. If the writer of the foregoing remarks is really (as he would appear to be) of opinion that those who in the past have generally been the means of bringing about strikes have now a "vivid sense" of their ultimate worthlessness to the victor, and a belief that they have usually been due to faults of temper or tact, we can only say that we wish it were possible to share that opinion—which is certainly not founded upon careful observation—and add a recommendation to those who may fancy that the Board of Trade figures are sufficient ground for such an opinion to study the reports of speeches recently delivered in South Wales by the Trade Union leaders, and then to follow the course of events in that part of the world during the coming months. While we would gladly believe that "a better spirit" is generally growing, and that strikes are now becoming "vividly" discredited among the working classes, it is difficult to found such a belief upon the fact that during a period of exceptionally good trade, with steady employment and high wages, strikes of serious magnitude have been happily more rare than in former years. We prefer, before adopting these opinions of "The Times," to wait until the working classes have faced the effects which the coming depression in the shipbuilding trade and the return of all the "reservists" from South Africa will have upon the labour market, and have gone through the period of reaction that inevitably succeeds one of exceptional activity. Meanwhile, the Federation leaders in South Wales are displaying neither the temper nor the tact calculated to avert a stoppage of work in the collieries of the district. The men who affirm that any miner who will not voluntarily support the Union ought and must be made to support it, who at the outset of delicate negotiations declare that the plan of settlement laid down by the Union is the only one they will accept, who protest that the combination of the owners ought to be declared "illegal," and who talk of their employers as having in the past "bartered away the life-"blood of the workers," can scarcely be considered examples of men animated by "a better spirit." We should rather describe them as "hot-headed mischief-makers" who, unfortunately, are not as yet discredited by those whom they were addressing.

Lamp Accidents and Gas Popularization.

The London County Council can certainly boast of having officers who obey orders. It is now some years since the majority of this body declared against the legal standard for the petroleum oil trade in this country—the flash-point of 73° Fahr. At that time the Scotch paraffin interest took a benevolent part in denouncing the callousness of the Government in permitting the country to be deluged by cheap low-flash American oil. But the resistless advance of the importation of Russian oil, cheaper even than the American product, was too much for the Scotsmen, who are nothing if not logical; and latterly the Heart of Midlothian has ceased to be greatly stirred over this matter. But the London County Council officials remain true to instructions. Mr. A. Spencer, the Chief Officer of the Public Control Department of the Council, has once more reported dutifully against the legal flash-point. Last year the number of fatal lamp accidents in London dropped to 18—the smallest recorded for years, if not for the complete historical period. Now, does this consideration mollify Mr. Spencer's judgment of the legal flash-point? Not at all. He merely repeats all the old statements respecting the presumptive innocuousness of oil flashing at more than 100° Fahr., as though the matter were still a point of practical politics. Nothing new has transpired to justify the attitude of the Council towards petroleum, while a good deal has happened to indicate that this egregious body had better have left the flash-point alone. But the word has evidently not been circulated among the officers; and therefore we have Mr. Spencer wasting his valuable time in flogging a dead horse. This is what the County Council understand by efficiency in the public service. Without having the remotest idea of what would be the economic effect of shutting out all the American and Russian lamp-oil from the whole of the United Kingdom because there were 18 fatal lamp accidents last year to 4½ millions of people, they permit their loyal and painstaking officers to go on making ridiculous reports on the imaginary security that would ensue from the use of an imaginary oil. For, from the trade point of view, kerosene of more than 100° flash-point is a purely imaginary article. It is not a common

commodity, nor ever could be. It does not occur to Mr. Spencer that possibly the popularization of gas has some connection with the decrease of lamp accidents. If the gas supply were in the hands of the Council, this would probably be discovered at once.

Municipal Extravagance.

THE writer in "The Times" is continuing his exposure of the results of Municipal Socialism, and has come to the point of the enormous modern increase of local debt. He notices the usual Progressive explanation that much of this is on account of "remunerative" works, but remarks that this does not console the ratepayer for the actual increase of his burdens. However profitable municipal assets may be, they do not make life easier for the ratepayer, who has to find the wherewithal in meal or in malt. For, as is duly mentioned, there is frequently much doubt as to the reality of municipal profits. The book-keeping is not convincing; and often expenses are transferred from one account to another. Thus, an enormous amount of street paving may be done by the Gas Department; while the expenses of street widenings required solely for tramway purposes may be charged upon the improvement rate. When it comes to the mutual relations subsisting between an electricity supply committee, a sanitary committee, and others equally interested in the hoodwinking of the ratepayer, who can say under which thimble the nimble deficit pea will be found? On the subject of the unfair rating of municipal property, it is considered—as we have lately argued—that when this element is added to the other trading results, the public would usually be the gainers if the property were in private hands.

Supposing, however, that a municipal property—it is usually the gas undertaking—is really profitable at the prices charged, it does not follow that the ratepayer benefits, by any means. The money may be applied to reduce the loss of an unprofitable department, or it may go for some purpose to which the authority could not legally apply the rates at all. "There is one large town where the "profits made out of the alleged unduly high charges for "municipal gas have been used for the erection of a costly "technical school, which is thus regarded as representing "the proceeds of a special tax on the gas consumers." Where can this be? On the other hand, where the gas profits go in reduction of the rates, "then we arrive at the "position that Yorkshire wool merchants, for instance, who "burn practically no gas, but are comparatively large rate-"payers, get full benefit of the profits provided by the gas "consumers without adding to those profits themselves." Perhaps the example of this participation in rate reductions by those who do not deserve it, is partly responsible for the open and unabashed self-seeking of Labour representatives, who own that they go upon municipal bodies to do the best they can for their own people. The subject of the travelling expenses of municipal deputations, supposed to be an essential means of teaching town councillors their business, is not left unexplored. "The trail of excessive "expenditure as the outcome, to a great extent, of various "forms of Municipal Socialism is seen in every direction; "but the money comes from the purse of the ratepayers." That is so, though every effort is made to conceal the fact.

Deceptive Journalism and Rate-Aided Competition.

Just as it is easy to cook figures so as to make them present a different condition of affairs from the actual, so may facts be twisted into deceptive shapes and palmed off on the credulous. A writer of notes under the heading of "Civic London" in the "Daily News" has been trying his hand at the game, and has made a bad job of it, but nevertheless he may have succeeded in hoodwinking some heedless readers. Perhaps it is doing him an injustice to say this; if so, then he is incapable of properly interpreting the true meaning of the plainest of phraseology. In a writer for the public information and guidance, the fault is almost as bad as (to apply a mild adjective) the unbecoming action. However, whatever prompted him—whether the desire to mislead by distorting facts or a regrettable incapacity—the writer of the notes under attention has endeavoured to tone down the triumph of the South Metropolitan Gas Company over municipal trading at the expense of the ratepayers, by securing for themselves and all ratepayers in Bermondsey and Woolwich who have not even the interest of electricity users, protection against unfair taxation on the Borough Councils launching out into the financial uncertainties of electrical supply. There was nothing wrong about the Company taking the precautionary step they did; and they took it simply because they happened to know something more about the results of municipal electrical ventures than the writer in the "Daily News" and others of his kind.

A Pack of Misstatements.

However, the scribe in our daily contemporary essays to give heart to those local authorities who see in the Bermondsey precedent the rude shattering of some of the fine castles they have been busily building in the air; and, in doing this, he makes certain misstatements which we have no hesitation in challenging him to prove. In the first place, he denies (by adducing another reason) that the Company opposed the Bermondsey and Woolwich Orders as ratepayers. Now, we ask him can he tell us who more than the South Metropolitan Gas Company in the two districts named are interested as ratepayers in the success or otherwise of the Council's proposed trading undertakings? It was rather an oversight on his part to devote the paragraph succeeding the ones attacking the South Metropolitan Gas Company's action to the question of "The Burden of Rising Rates." In that, he writes: "There may be no reason why the rates should be larger because of the creation of Borough Councils, but the fact remains that they are larger not only in Southwark, but in nearly every other borough in London." Herein we have quite sufficient excuse for the action of the Company, without going into other legitimate considerations. They, with the other ratepayers, feel the "burden of rising rates;" and, as a commercial undertaking depending for the continuance of their success on the cheapness of their product, they have no desire for the burden to grow heavier through municipal vanity and speculation. The "Daily News" man discloses a grave deficiency of acumen when (going back to the original paragraph) he tells us that the real reason of the Company's opposition to the Electric Lighting Orders is their fear that municipal competition in the lighting business will break down the "rich monopoly" they have enjoyed in South London for many years. This is palpably a case of the blind trying to lead. The writer has not read the account of the proceedings before the Parliamentary Committee, or he would not have made such a worthless assertion. The Company did not oppose the Orders with the object of overthrowing the electric light proposals of the Borough Councils, but only to get the insertion of a clause which should absolve the Company from having to contribute to the maintenance of undertakings which, as purely commercial concerns, should be self-supporting. The uninformed writer of the "Daily News," it is clear, does not know that of all the Gas Companies in and around London who do not fear electric lighting—the one that is least concerned about it, so long as the competition is carried on on fair and equal lines—is the South Metropolitan Company. Charging a low price for their gas, with their works well officered and manned, and with the incandescent burner, they can offer the householder an illuminating value which cannot at the price be touched by electricity. That position they do not want to be affected by a further increase in the "burden of rising rates." Surely, now, even our friend of the "Daily News" must confess that the Company's action was a sensible and a defensible one.

Further Strange Arguments.

The subject is an interesting one and the paragraphs offer so many texts on which to comment that it is a pleasure to deal with them. Reading the next sentence in conjunction with the two that follow, the writer of the "Daily News" must either admit that the first one is silly, or that the next two are false. We are prepared to characterize all three as both. He writes: "The Company sought to impose a condition which they hoped would render it well nigh impossible for the local authorities to supply electricity unless each year's accounts, standing by themselves, showed a profit. Municipal lighting is generally very profitable; but the first and second years' working nearly always entails a loss, just as happens in the early days of most business

ventures. The subsequent profits, of course, wipe off the early losses." Now where was the necessity for the Company to spend the money they did merely for the sake of getting the objectionable condition inserted in the Orders, and why did Parliament admit the justice of their contention by agreeing to its insertion, if municipal electric lighting is generally so "very profitable?" The Company must have proved their case that it was otherwise, and that ratepayers were sufferers in consequence, or Parliament would never have consented to the insertion of the condition. It would have been absolutely superfluous. "The subsequent profits, of course, wipe off the early losses." This depends upon the extent of the profits and the losses; so that there is no "of course" about it. It would be interesting if the "Daily News" critic would give some authentic figures to show the foundation on which his assertions are based.

Words of Consolation.

If the Borough Councils have been concerned over the imposition of the condition by Parliament (which shows the appreciation of our legislators of the sound maxim that "every tub should stand on its own bottom"), it is evident the Councils do not know their own business so well as their journalistic friend. He tells them that the condition is one which need give them "no concern at all." Well then there is an end of the matter; but, we have a faint suspicion that the Councils would have preferred to be able to "free-wheel" over the whole district to make up any deficiences on their electrical ventures. If not, they ought to be called to account by the ratepayers for spending money in opposing the insertion of the simple condition asked for by the largest ratepayers in their districts. However, we hope the words of the "Daily News" expert in these matters will afford them the consolation which his statement suggests they stand in need of. They may even now "laugh at the ratepayers" who do not want to contribute to the support of the supply of electricity to the minority of the ratepayers, because the "Daily News" authority has found a "saving clause" in the condition. The latter part of the provision must be quoted to follow the Councils' comforter. "The undertakers," it says, shall fix annually the charges to be made for the supply of energy in the then ensuing year at such rates (not exceeding the maximum rates specified in the Order) that, as far as is reasonably practicable, the revenue for that year shall not be less than the expenditure for the year." The "saving clause" consists of the parenthetical restriction and the words "as far as is reasonably practicable." Let us see what value they have in administering comfort to the Councils. In the first place, if the authorities charge their maximum prices, then they will have to early close their shops, for electricity at the maximum charges will not be patronized for any length of time by many people in Bermondsey and Woolwich while they can get gas from the South Metropolitan Company at the present price, and incandescent mantles for 3d. or 4d. each. Then it would be necessary for the Councils to work up to the maximum prices before ever the words "as far as is reasonably practicable" become worthless, and by that time there would be some indignant ratepayers and electricity users for the Councils to meet. It requires nothing short of a fool's imagination to discern any great elasticity in what the "Daily News" writer terms the "saving clause," and which he says leaves the Local Authorities with "as much liberty as before." The person who penned the paragraphs to which we have been referring must really be more definite and consistent in his arguments if he does not wish to expose himself to ridicule. Before we leave him, the inquiries ought to be put as to why he applies the word "monopoly" to gas and not to the municipal undertaking, and why the one monopoly should receive support at the expense of the other and those who are not customers? Other businesses have to bear their own losses; why should electricity be specially favoured? We fail to see. But there, to further argue the matter is almost as bad as "ploughing the sands," for does not the "Daily News" writer say that "municipal lighting is generally very profitable"?

A Troublesome Shareholder.

It is impossible to satisfy some people, whatever one may do—at least, that is the only conclusion it is possible to come to on reading the accounts of the half-yearly meetings of the Eastbourne Gas Company. This Company enjoy extraordinary prosperity, even in so prosperous an industry as that of the manufacture and sale of gas; and yet the proceedings at the meetings are wont to be of what is termed a "lively" character. At the meeting in the early part of this year, a shareholder (Mr. H. M. Simmons) vigorously attacked the Board with regard to some coal contracts which were entered into in the spring of 1900; and at last week's meeting, the same gentleman had great fault to find with the proposal of the Directors to grant their late Secretary (Mr. J. H. Campion Coles) a retiring allowance of £250 per annum. Taking into consideration the high dividends paid and the excellent position of the undertaking, it is certainly hard on those responsible for the management that meeting after meeting should be characterized by most unseemly wrangling. Doubtless the shareholders and others intimately connected with the Company are able to estimate the objections raised at their true worth; but as far as other people are concerned, this may not be the case, and great harm may thus result. The Consulting Engineer (Mr. H. E. Jones) warned the proprietors last week that they were knocking the price of the shares down every time they indulged in these acrimonious discussions; and it is to be hoped that his words will be taken to heart before the day comes round for another meeting of the Company. The knowledge that they are depreciating the value of their own shares, may induce the hostile proprietors to consider the advisability of altering their present line of conduct—to the ultimate benefit of themselves and everyone else interested in the Company. The chief point of attack (there was also a squabble with reference to the Directors' fees) on the present occasion was, to say the least, an exceedingly ill-chosen one—and one calculated to do an immense amount of injury to the cause of the malcontents.

And an Old Servant.

It was stated by the Chairman that Mr. Coles had been Secretary to the Eastbourne Gas Company for no less than 46 years; and after such a period of service, it is surprising indeed that anyone should have been found to object to the granting to him of so moderate a pension as £250 a year. Surely the work of a lifetime deserves some recognition from the shareholders in a Company who are receiving dividends at the rate of 14½ and 11½ per cent. per annum on the different classes of capital. By a majority, the pension was agreed to at the meeting; but how much more graceful, and how much more just, would it have been to have passed the resolution unanimously. Even Mr. Simmons felt called upon to give some reason for his opposition to the granting of the pension; and he referred to the fact that a few years ago some irregularities were discovered in the accounts. This was true; but, for his part in the affair, Mr. Coles deserves praise, rather than condemnation. From a statement of the matter contained in a local paper, it appears that, while Mr. Coles was absent in America, one of the clerks in his employ committed the irregularities complained of Directly Mr. Coles discovered the books had not been properly entered up, he called in a firm of accountants and a large staff of clerks. The books were thoroughly overhauled; and the deficiency discovered was afterwards made good by Mr. Coles, whose action met with the entire approbation of the shareholders. Altogether, the wrong-doing of the clerk, who had been regarded as perfectly trustworthy, is said to have cost Mr. Coles about £2000. And this Mr. Simmons regarded as being sufficient justification for opposing the granting of a pension to a man who had held a responsible position with the Gas Company for close upon half a century! Perhaps, however, when questioning the Chairman on the matter at the meeting, Mr. Simmons was only imperfectly acquainted with the facts of the case. Anyhow, this is the kindest thing to suppose.

Waverley Association of Gas Managers.—The Secretary of this Association (Mr. W. Young, of Penicuik) intimates that the autumn meeting will be held in the Queen's Bay Hotel, Joppa, Portobello, on Thursday, the 11th inst. The chair will be taken by the President (Mr. Laurence Bell, of Innerleithen), who will deliver an address. At the close of the meeting, the members will dine together in the hotel, and then drive to the Inveresk Paper-Works, over which they will be shown. On their return to the hotel, tea will be served.

WATER AFFAIRS.

Congress of the Institute of Public Health.

Of the many questions brought under notice in the course of the proceedings at the congress of the Royal Institute of Public Health in Exeter, which came to a close last Wednesday, those relating to water supply claim attention in these columns on the twofold ground of their immediate connection with one of the principal subjects dealt with therein, and of their important bearing upon the public health—the *salus populi*, which the Latin maxim tells us is the supreme law. We have therefore, in the article which appears in another part of the "Journal," brought together those portions of the addresses and papers which contain points of either special or general interest. Necessarily, the water question stands first. The value of pure water as an aid to sanitation does not require emphasizing—it is recognized everywhere; and, so far as providing an ample supply of it for the use of dwellers in towns is concerned, the choice lies between going to a distant source in order to secure it, and taking that which lies at our doors, and making the best of it. There is naturally an objection to drinking river water; and that which is supplied to London has so frequently been characterized by its detractors as "dilute sewage," that some people have come to believe it. According to them, the Thames is bad, but the Lea is worse. A gruesome picture was drawn of the condition of the latter river a few weeks ago by a writer in one of the London morning papers. But we did not see that any serious epidemic resulted from the consumption of its waters, simply because the purification process it had undergone had rendered it perfectly fit for human consumption.

This question, of the efficacy of filtration in rendering water pure, was the point emphasized in the paper read by Mr. Caink, the City Engineer of Worcester, at the congress, as it was in the remarks he made at the Conference on Water Supplies and River Pollution held in London last October. Dr. Rideal laid down the proposition, in the paper he read on that occasion, that "the most important point in judging "of the purity of a water supply was certainly the typhoid "fever death-rate;" and Mr. Caink cited his own case in support of it. Worcester is supplied from the Severn, which is the receptacle for drainage from various towns and villages along its banks. Prior to 1894, the prevalence of typhoid fever led the Corporation to seriously consider the advisability of abandoning the river, and sinking artesian wells. The project, however, was dropped in favour of one for materially increasing the area of the filter-beds; and the works were completed during the spring of that year. The effect was marvellous. Down to 1894, the average case-rate for typhoid fever was about 150 per 100,000 per annum; whereas from the beginning of 1895 till the end of 1901 it was 37. Comparing these figures with the average case-rate over the ten years ending with December last of three towns deriving their water from deep wells regarded as unimpeachable, Mr. Caink showed that it was no less than 149 per 100,000; while in three towns supplied from upland sources it was 133; whereas in the case of three towns supplied with filtered water it was only 77. The author brought this matter home to his hearers by citing Exeter, where the effect of doubling the filtering area had been the reduction of the typhoid cases from an average of 70 to 30. It is difficult, in the face of these figures, to resist the conclusion that the impurity of the water supply was the cause of the high death-rate, and that with the removal of the cause, by efficient filtration, the effect ceased. The paper was a valuable contribution to the proceedings.

An interesting constructional paper was read by Mr. W. Ingham, the Water Engineer to the Torquay Corporation, descriptive of a typical case of designing water-works to supply a population of 50,000 persons. The works described were, in fact, designed for his own town; and those who took the opportunity of visiting them during the congress were delighted with what they saw. The author denied himself the "luxury," as he termed it, of a masonry dam, and substituted therefor a concrete wall in the trench, stopped just under the ground-line, and opened out so as to receive the puddle for the top of the embankment. He acknowledged that in this matter he differed from his English professional colleagues; but the plan has answered in America, and Mr. Ingham has found puddle reliable. Another point was the size of the overflow weir. In this matter he deprecated rigid adherence to empirical formulæ, and advised engineers to so design the weir that, with a maximum flood, the water should not exceed 2 feet in depth over the lip. As many of our readers may be aware, the author favours circular reservoirs, where land can be obtained cheaply; and he considers filter-beds should be constructed in the neighbourhood of service reservoirs. With regard to distribution, Mr. Ingham has already related his trouble with obstructed mains; and he therefore directed special attention to this point. Such a scheme as he described would cost about £3 per head of the population, and therefore it should commend itself to the attention of young engineers who may be engaged in the construction of water-works.

In the address delivered by the Mayor of Plymouth (Mr. J. A. Bellamy) to the section devoted to Municipal and Parliamentary Hygiene, he showed himself equally conversant with this subject as with the business of the important Gas Company over whose operations he presides. He was exceedingly happy in his definition of the title of the section in an equivalent number of words. "Municipal and "Parliamentary Hygiene," translated into every-day language, means, he said, "healthy prolongation of life." The happiness of mankind in civilized communities must, in the first place, as he pointed out, depend upon the health of the people. "What can be done, by means of the existing "machinery, to make things better than they are for those "who live in towns and cities?" This was the question propounded by Mr. Bellamy; and the obvious answer is: Secure for them plenty of pure air and water, let the drainage system be perfect, provide improved dwellings for the poor, and adopt the most practicable measures for ensuring personal and general cleanliness. One means of obtaining at least some of these objects is the institution of a system of thorough inspection, more especially in the very densely populated portions of towns; and the initial step in the direction of carrying it out should, in Mr. Bellamy's opinion, be the appointment as Medical Officers of Health of gentlemen who can devote the whole of their time to the work. At present, these officers are generally medical men who undertake the duties, at a small salary, as an auxiliary to their regular practice. The latter naturally has first attention, because the income from the other source is not sufficient to permit of its neglect. Mr. Bellamy thinks that there is sufficient work in an office such as the one in question to occupy the whole of the time of the person holding it; and he should be paid such a salary as would enable him to do this. The additional expense would scarcely be felt by the general body of ratepayers; indeed, it is a question whether they would not, in the long run, be gainers by the change.

The only other matter calling for notice is the proposal brought forward by Dr. Poyntz-Wright for the appointment of a Minister of Public Health. In a short paper, he enumerated the defects of the system under which, at the present time, health officers, sanitary inspectors, and others are appointed and carry out their duties, and expressed the opinion that they could all be remedied by constituting the Health Department of the Local Government Board a Ministry of Public Health, with a member of the Government at its head. Dr. Bushnell, who spoke in support of the proposal, thought that the chief of the new department should be a Minister of Cabinet rank, as tending to make the service better. The proposal was favourably received. It may be added that in the course of the proceedings a resolution was passed asking the Institute to co-operate with the British Association of Water-Works Engineers in drawing the attention of the Government to the urgent necessity, in the best interests of the public health, for the formation of a National Water Board. The two propositions furnish evidence of the existence of a growing desire to concentrate in a Department of State the supervision of matters relating strictly to sanitation and the water supply of the country.

Midland Association of Gas Managers.—The Hon. Secretary (Mr. A. Cooke, of Oldbury) announces that the autumn general meeting of the Association will be held at Birmingham, on Saturday, Oct. 11. Members will no doubt particularly notice the alteration in the day of meeting—from Thursday to Saturday—and make a special effort to attend.

ESSAYS AND REVIEWS.

ELECTRIC LIGHTING MEMORANDA.

Cable Fire at Islington—Probable Cause—The Question of Depreciation—Value of the Example of the Electric Tramway Obstruction at Brentford.

THE London newspapers had an interesting piece of news to liven up the dull season, in the "destruction" by fire last Tuesday evening of the electricity supply works of the Islington Borough Council. The particulars of this accident will be found in another column; but it turns out that the destruction was limited to the main cables and their connections at the back of the switchboard, so that the lighting was partially resumed after a total suspension of about twenty-four hours. It is unnecessary to make too much of a disaster of this nature, which is, one would suppose, more or less unavoidable in connection with electricity supply from a central station. At any rate, it should be possible to assume that an installation which cost so much, and is of so recent a date as the one in question, would be as well designed and constructed as most to avoid risk of a breakdown. Yet it appears from a criticism of the occurrence in the "Electrician" that there was, as a matter of fact, in the Islington station, a dangerous state of things in respect to the main cable connections which was in course of being rectified when the fire broke out and the danger was realized. All the various cables were brought together and not isolated from each other in any way, so that when one became overheated "owing, it is thought, to the development of a fault," it communicated the flames of its burning indiarubber insulation to all the rest, with the result that all machines had to be shut down.

The incident belongs essentially to the class of breakdowns which used to occur so frequently in the early days of commercial electric lighting, and were invariably excused as having nothing to do with the "system," or the "principle." Then it was commonly a boiler running short of water, or an engine going wrong at an inconvenient moment. Of course, as experience was reaped, these defects of mechanism were corrected; but the nature of the operation of generating and distributing electrical energy as a hand-to-mouth business, remained incurable by even the most lavish provision of stand-by plant. As the Manchester Corporation mishap illustrated, a weak link in the chain of causes and effects is always liable to be declared—naturally, at some particularly awkward time. An electric lighting plant, like gas-plant, must be constantly outgrowing itself somewhere; and when there is no effective reserve, the consequence must be an annoying stoppage. This Islington affair must be regarded as a commentary upon that phase of English central station practice which has on a previous occasion been discussed in this column. It has been asserted that in England there has been too little of the conductor copper put underground, and too much reliance placed upon insulation to keep what copper there is efficient for its purpose under an overload. We do not know, of course, how far this criticism applies to the case of Islington; but there appears to be some ground for the suspicion that the originating trouble may have been of the character suggested.

There is another aspect of the facts, which is disclosed by the "Electrician's" remarks upon the arrangements in use in the station. Even seven years ago, we are told, it could not have been considered good design to bunch together a number of indiarubber insulated feeders and other cables at the back of a high-pressure switch-board; "but to leave such an arrangement still standing in 1902 in a generating station responsible for the whole public and private electric lighting of a large Metropolitan borough is inexcusable." The fact of its being the Electric Lighting Committee of a large Metropolitan borough who did this thing is beside the question. The neglect would be equally blameworthy in the case of the smallest Urban District Council convicted of having misunderstood their duty to the public. The real question that looms large in this connection is the much-debated one of depreciation. "Even seven years" is inferentially regarded by good electrical engineering judgment as a period stretching back to ancient history and the infancy of their craft. But this means nothing more nor less than the pressing need for that wholesome provision against the "antiquation" of plant which comes under the general term of depreciation, and is one of the points of good administration in which municipal electricity supply is notoriously deficient. Out of what fund will this Islington disaster be made good? It is to be noted that our contemporary has not had anything to do with the Islington accounts since November, 1900—more ancient history.

It is such experiences as this that test the rules of works finance. There is, moreover, nothing of the marvellous in it, to excuse the responsible persons from censure for not being prepared for such an eventuality. Cable fires and their consequential damages and loss have been only too common incidents of electricity supply, especially in London, of late years. They are, indeed, always happening somewhere. It would therefore not be just to charge the whole of the loss to an insurance fund, which should rightly only be drawn upon to make good extraordinary and unavoidable damage. This was neither the one nor the other. It is characterized in the terms we have already quoted as "inexcusable." What, therefore, will the partisans of municipal electricity supply, as it is practised at Islington, have to say concerning the responsibility for it? If Islington were an exception to the common rule, there would be an easy answer to the query. Neither should we press it with any vehemence; for the misfortunes of a solitary ne'er-do-well are of no general interest. Islington, however, does not stand alone in this respect. Besides forming one of that glorious ring of electricity-supplying local authorities pointed to with such pride by Municipal Progressives as bounding London on the North, the undertaking is financed exactly like most others of its kind. Hence the value of its example.

The future of electric tramway working is a subject of ceaseless speculation. This column of the "JOURNAL" has been made very objectionable to some who admire the system not wisely but too well, by the candour with which certain discomforting facts of the craze for tramway electrization have been exposed here. We have ascertained from several examples that the expectation of the extreme cheapness of electric traction has not been universally justified; and we have doggedly maintained the opinion that electric power, without a clear road, will do little for any tramway line. The London County Council are preparing to demonstrate this elementary truth, at enormous expense, on the Southern Metropolitan routes; and meanwhile the London United Tramway interests—the Company and their public—are painfully experiencing it all day and every day on their Twickenham and Hounslow extensions, which pass through the totally unsuitable narrow main street of Brentford. Stoppages of eight and ten minutes in crawling a quarter-of-a-mile are constant. The Company are learning that it is easier to "work" a District Council election for the elimination of official opposition, than it is to induce one coal carman to forego his rights to the use of the roadway. The Magistrates are on the side of the carman; and the Local Authorities are wondering what could have possessed them to consent to the invasion of huge tramcars conveying 69 passengers, in lanes which have no adequate room for an extra perambulator.

CHANGES IN RATES OF WAGES AND HOURS OF LABOUR IN 1901.

WE have received from the Labour Department of the Board of Trade their Ninth Annual Report on Changes in Rates of Wages and Hours of Labour in the United Kingdom, bringing these elaborate tables of statistics down to the end of 1901, and giving preliminary figures for the first half of this year. It is, we suppose, impossible to expect of the modern writer for the Daily Press that he should do more than extract from such an extensive report as that in question a few of the statistics brought together in the summary with which it is prefaced, copy out the remarks of the compiler thereon, and add such spicing of comment as may occur to him while making this superficial survey of the information contained in the 160 pages of closely printed matter comprised in the report. That is the way of modern journalism—which will devote more columns to the statistics of a "Test Match" than it will lines to statistics concerning the everyday-life of the Nation, be they never so important. And the public seems to have an increasing appetite for the superficial and the trivial; so one can expect nothing better. But, as it happens, the series of reports at present under consideration is one that not infrequently conveys an entirely erroneous impression to the casual examiner of and commentator upon its principal features, and the paragraphs that find their way into the daily newspapers are consequently more than usually misleading.

The central fact upon which the casual journalist has fastened and has used for his headline is that there has been a "decline in wages for the first time since 1895"—the net weekly decrease in the industries for which it is possible to obtain definite statistics amounting to £77,000; while, taking into account the various dates at which the changes came into operation, the total net decrease in wages paid during 1901 due to changes recorded in the report was equal to about £1,584,000 per annum. ["The Times" remarks that "much is implied in the fact that the decrease of the *weekly* wages bill was above £1,584,000." The italics are ours. Much would be implied in that "fact"—if it were one.] But to state those facts without going further into the matter is to give the reader a decidedly false idea of the real state of the labour market as judged by changes in rates of pay; the truth being that, apart from two particular industries in which the rates of wages are governed by conditions different from those affecting wages in other branches of trade, there was last year an actual net increase of wages to record (not, as "The Times" has it, "a decline very nearly all round"), though only a small percentage of the total number of employees was affected.

The two particular industries to which we have referred are those of mining and iron and steel making, in which increases and decreases of wages take place almost if not entirely regardless of the general condition of the labour market. As is well known, during the recent great boom in coal and iron prices, the miners and iron and steel workers obtained very large increases in wages, causing the annual returns to show a most flourishing state of affairs in the labour world; and now, when the reaction

is being felt, the consequent reductions in wages are occasioning the hand-to-mouth journalist passing spasms of depression. The truth is that, apart from the fluctuations in the coal and iron trades, wages have shown an increase in every year since 1893, and up to the end of the first half of this year; while, in the two trades referred to, the balance of the fluctuations is still on the side of the men, by a considerable amount. The following table, compiled from various sections of the report, shows, much more clearly than does the summary, the true bearing of the figures for the period covered by the annual reports since they were first compiled.

Net Amount of Change in Weekly Wages.

Year.	Mining. £	Iron and Steel Trades. £	Other Trades. £	Total. £
1893	+14,496	− 1,232	− 838	+12,426
1894	−46,746	− 1,059	+ 2,714	−45,091
1895	−30,937	− 291	+ 3,017	−28,211
1896	− 5,415	+ 1,766	+30,241	+26,592
1897	+ 6,909	+ 899	+23,699	+31,507
1898	+57,680	+ 2,522	+20,613	+80,815
1899	+54,151	+13,789	+22,965	+90,905
1900	+168,362	+14,766	+26,245	+209,373
1901	−62,635	−20,344	+ 5,636	−77,343
Net total	+155,865	+10,816	+134,292	+300,973

For eight years in succession, it will be seen, the tendency of wages, in industries where rates of pay are governed by factors other than the selling price of the product, has been upward; and the net increases recorded since 1892 represent an addition to the wages bill of the country due to actual alterations in current rates (as distinct from alterations in the nature of the work done, or the length of service or increased experience of the workers) of about £7,000,000 per annum. The changes recorded in the first half of this year show an increase in all trades where changes have taken place, other than the mining and metal industries, equal to about another £80,000 per annum. The coal miners have sustained decreases amounting to over £60,000 per week, which, however, still leaves them nominally nearly £100,000 per week better off than at the end of 1892, and about £160,000 per week better off than at the end of 1897.

The questions that arise in one's mind while considering these figures are, first, whether the workers of the country are really receiving £7,000,000 more in wages per annum than they did ten years ago in consequence of these changes in rates, and, second, whether, if they are, they are really earning the better rates of pay. For it by no means follows that an increase in the current wages rate in an industry means an increase in the weekly wages bills in that trade. It is quite possible, as bitter experience has proved, for higher costs of production, due to rising wages, so to cripple a trade in its race with foreign competition as actually to reduce the volume of work done to an extent that results in the total amount of wages paid at the higher rates being ultimately less than that paid at the lower—a point in economics that those who imagine that every increase in rates of pay wrung out of an employer is necessarily followed by increased earnings by the employed, would do well to ponder. As regards our second point—whether the increased wages that are being received are being earned—we would merely remark that it is extremely doubtful whether any material improvement in the quantity or quality of the work done by a body of workmen follows an increase in their rates of pay when obtained by agitation, or by any process other than that which makes the increase conditional on better working.

The report shows that the changes detailed therein were largely obtained—to a degree, in fact, unprecedented in the nine years for which records have been kept—by other means than that of a stoppage of work. Only 14,500, or 1·6 per cent., of the workpeople affected by the changes in rates of wages recorded were concerned at the time in trade disputes, as compared with 9 per cent. in 1896, and a previous best of 3 per cent. in 1899. Of the 932,126 persons affected, 191,205 had their wages altered through the working of sliding-scales; 507,355 through the operation of Conciliation Boards, of Joint Committees, or of other established agencies for settling wages questions by conciliation or arbitration; and 233,566 through direct negotiations between the parties concerned or their representatives. Last year was, indeed, unusually free from any prolonged or serious stoppage of work over the question of wages; but it must not be forgotten that this return takes no cognizance of strikes or lockouts which resulted in no alteration in wages. The large increase in the percentage of workpeople whose wages were settled by Conciliation Boards, &c., is mainly due to the formation or re-establishment of such Boards in the coal-mining industry. In every important coalfield except South Wales, there is now in operation a Conciliation Board, consisting of representatives of the organized employers and organized workpeople, but, especially in regard to the Federation districts, these boards have yet to win their laurels in bringing about the inevitable return to normal wages without a stoppage of work.

Looking at the detailed tables of alterations in wages outside the mining and metal industries, we find that in England and Wales the steady rise which has characterized wages in the building trades since the Board of Trade records were commenced continued throughout 1901, and also through the first half of this year. In 1901, over 29,000 operatives received advances, and less than 1000 sustained decreases; whereas in Scotland there were practically no increases, but 9000 men had their wages reduced. In the past eight years, no less than 388,564 men in the building trades have obtained increases in England and Wales, against only 862 who sustained decreases (practically all in 1901). Seeing that the bricklayer and his fellow workers have notoriously reduced their daily output in recent years, it is not surprising, in view of a net increase in wages amounting nominally to nearly £2,500,000 per annum, that the cost of building should have so seriously risen.

In the miscellaneous trades, the only change of any importance was in the printing trade—14,930 hands obtaining a net increase equal to about £53,000 per annum, while 17,920 hands obtained reductions in their hours of labour averaging 1·7 hours per week. This was, in fact, the only recorded change in hours of labour of any importance; the total number of workpeople affected by any such change being only 29,276, with an average reduction of two hours per week.

The heading "Employees of Public Authorities" shows, as usual, a considerable number of increases granted, and practically no decreases; but in 1901 the grants of higher wages to employees in the service of local authorities, as distinct from Government servants, were smaller in number and amount than in any year since 1895, the particulars being 5901 employees receiving increases averaging 1s. 9d. per week, with no recorded decreases. In 1901, as in 1900, the police received material increases of pay, which no one certainly will grudge them. The police do not take advantage of their being public servants to bring political pressure to bear upon the Treasury—which cannot be said of many servants of local authorities. Gas workers (other than those employed by local authorities) do not figure largely in the report; the only item being an increase in weekly wages, amounting to 1s. 0¾d. per head, obtained by 111 men—the smallest number on record. There have, however, been no decreases recorded since the Board of Trade began their series of reports in 1893.

THE GAS AND WATER STOCK MARKET.

(For Stock and Share List, see p. 636.)

BUSINESS last week on the Stock Exchange was extremely quiet, even after making allowance for the season. The chief centre of attention was the fortnightly settlement, which was not wholly unattended with some anxiety. And this, with perhaps other things, caused some degree of irregularity in the movements of prices from day to day. This vacillation, however, had pretty well expended itself before the close; and the last prices were not the worst of the week. After the conclusion of the settlement, there was a general exodus to holiday haunts, and the emptiness of the "House" was remarkable. In the Money Market, there was a strong demand for Stock Exchange and other purposes, and rates held stiff. In the Gas Market, business dwindled to very small proportions; and on some days the quietude approached stagnation. An unusual feature was the fact that Saturday was about twice as active (if the word active be not a misnomer) as any other two days of the week. However, there were a good many variations in quotation—almost without exception in the upward direction—and further announcements of enhanced dividends. Gaslight and Coke issues were all quiet. Dealings in the ordinary were at poor prices; and the stock repeatedly changed hands at 90, though prices were a shade better towards the close, and 91 was marked on Saturday. The secured issues were steady generally; the 3½ per cent. maximum appearing to have the best of it. South Metropolitan was fairly active, considering the sluggish rate of movement mostly prevailing; and, after being marked twice at 124, the price gradually hardened, until it closed at 125½. Commercials were almost unnoticed, and were quite unchanged. In the Suburban and Provincial group, there was a little more doing than the average of late; and there were some nice advances in value. Both issues of Brighton and Hove advanced seven points on the announcement of dividends better by ¾ per cent. than the previous rate; but not a single transaction was effected. Crystal Palace, Tottenham, and West Ham also rose; but Brentford was a point easier. In the local market, Liverpool had a smart advance. Among the Continental Companies there was a little business in Imperial at good figures, which looked much inclined to rise; but the quotation was left standing. Of the remoter undertakings, Hong Kong had a rise. In Water, there was very little doing. Grand Junction was lower; but East London 3 per cent. debenture advanced.

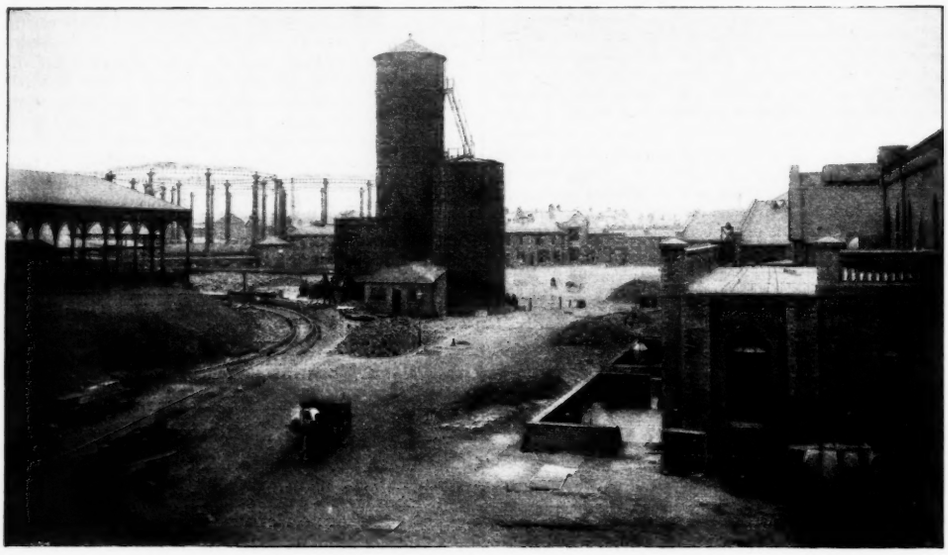
The daily operations hardly varied, and movements were as follows: On Monday, Hong Kong rose ½. On Tuesday, Brighton original rose 3; and ditto ordinary 2, and West Ham new ½. On Wednesday, Grand Junction Water fell 2. On Thursday, both Brightons rose 2; but Brentford old fell 2. In Water, East London 3 per cent. debenture rose 1. On Friday, Brighton original rose 2; and ditto ordinary 3, and Brenford old recovered 1.

Gas-engines using blast-furnace gas are to be built to supply blast to four of the new furnaces which the Lackawanna Steel Company are building at Stony Point, near Buffalo (N.Y.). This will be the first example of this practice in the United States.

SOME VIEWS OF THE WINDSOR STREET (BIRMINGHAM) GAS-WORKS.

Last week we took advantage of the opportunity afforded by Mr. Charles Hunt's retirement from official service to give an account of his professional work in Birmingham; but in doing so we refrained from detracting from the personal character of the sketch by including in it a detailed description of the large works that have supplanted the old, and comparatively speaking diminutive, works at Windsor Street during the thirty years that he has held the engineership. But since our last issue, the Editor of the "Birmingham Magazine" has kindly complied with a request we made to him for permission to reproduce in our pages some illustrations which he published towards the close of last year in a number of his periodical which was devoted to a special account of the connection of Birmingham with the gas industry, both in its municipal and commercial aspects. In publishing the illustrations, we may supplement the few particulars

Windsor Street Gas-Works, Looking North.



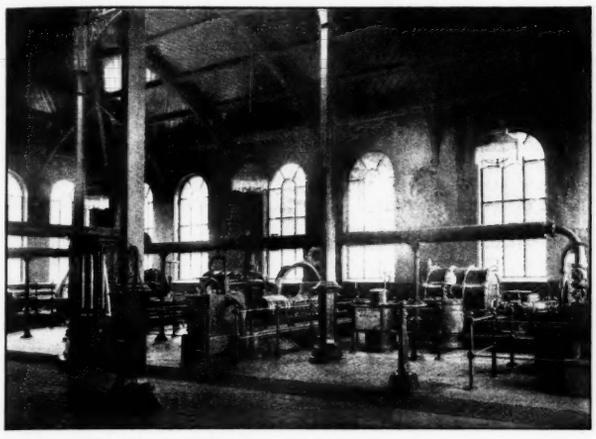
Windsor Street Gas-Works, Looking South.

of the works incorporated in last week's article by recording some interesting points suggested by the photographs.

We will deal first with the two general outside views, which were both taken from the head of one of the elevators used for loading coal out of stock into trucks for use in the retort-house. Looking north, one sees on the right the purifying-shed backed by the twin gasholders referred to last week. This shed is constructed of columns and girders; the object of the designer being to avoid enclosed spaces in which dangerous accumulations of gas might take place. The bareness which would otherwise be noticeable is relieved by the arches spanning from column to column, and which arches are formed with open-work cast-iron spandrils. The shed contains three sets of purifiers—viz., one set of six, 40 ft. by 32 ft., and two of four 66 ft. by 32 ft. One of the latter is worked by Cutler hydraulic valves, and the other by a Cockey dry centre-valve. The lime is prepared on an upper floor, to which it is conveyed in railway trucks by a waggon-hoist actuated by hydraulic power.

On the left is seen one of the three entrances to the retort-house, approached by a railway viaduct, the rail-level of which is 20 feet above the yard-level. The middle and foreground of the picture give an idea of the overhead railway system which commands practically the whole of the yard space, enabling many thousands of tons of coal to be stored at a minimum of cost. One of the waggons in position is a steel hopper waggon, the joint invention of Mr. Hunt and of Mr. A. L. Shackleford, of the firm

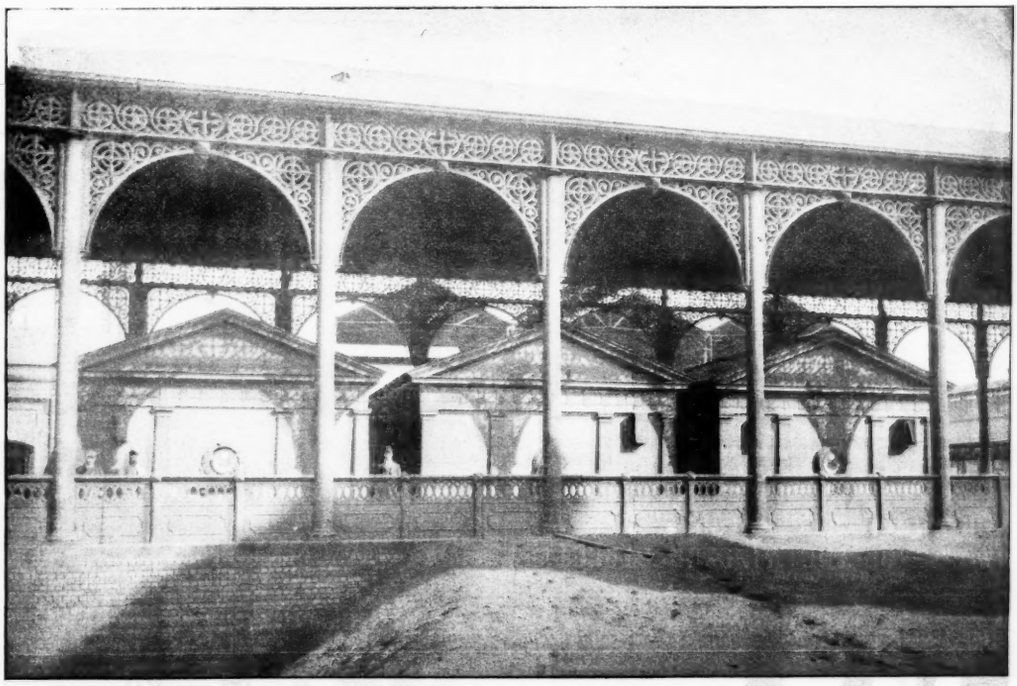
of Brown, Marshall, and Co. The feature of the design is the sliding-doors in the bottom, actuated by simple gearing, by means of which the entire contents of the waggon can be discharged by



EXHAUSTER-HOUSE.

one man in a very few minutes without manual labour. Several hundred of these waggons are now in use by the Corporation Gas Department—running to and from Windsor Street, Saltley, and Swan Village. Two other coal-elevators are shown; and in the distance is seen the overhead conveyor, by which the coke is carried across the yard to the screens, where it is sorted into large, small, breeze, and dust. It may here be mentioned that an additional coke-conveyor over 500 feet long has just been started to work. This is intended to take the whole of the coke from one side of 42 beds of nine retorts.

Turning to the view looking to the south towards Windsor Street, this shows on the right a part of the carburetted water-gas building, which is a recent erection. On the left, is partly seen the meter-shed, which will be alluded to presently, and in the distance are four of the remaining five gasholders, which were erected prior to 1872. In the centre of the picture are two scrubbers. When Mr. Hunt took over the control of the works in 1872, these scrubbers, which are 20 feet in diameter, were in course of erection; the intention being to carry them to a height of 40 feet, and wash the gas with ammoniacal liquor pumped over and over. This was in the early days of complete purification from ammonia; and at these works a dry process—viz., sulphate of iron, mixed with wood sawdust—had previously, and for many years, been largely employed. But Mr. Hunt had just come from a works where Mann and Walker's scrubbers had then recently been applied with great advantage; and he at once saw that the arrangement in progress at Windsor Street was not likely to secure the best results. Accordingly, he arranged (with the approval of his Directors) for the conversion of one of these short scrubbers into one of the Mann and Walker type. This, then, as seen in the picture, is the plant which was found effective—the gas entering first the short scrubber in which it was washed with ammoniacal liquor—for the complete removal of ammonia from the whole of the production of the old works, amounting



STATION-METER SHED.

ultimately to upwards of 5 million cubic feet per diem. It now stands in the way of the complete utilization of that end of the works, and will very probably be shortly removed.

Regarding the interior view of the exhauster-house, it may be mentioned that the exhausters are all of the Beale rotary type. Two—each having a capacity of 150,000 cubic feet per hour—were made by Messrs. G. Waller and Co., and are driven direct by horizontal condensing engines. The third in the same row is of the improved Beale type, and was supplied by Messrs. Bryan Donkin and Clench, Limited. This is driven direct by a non-condensing Robey engine. On the opposite side of the house is a pair of 150,000 cubic feet per hour exhausters coupled to a tandem high and low pressure engine, supplied by Messrs. W. H. Allen and Co. There is room on this side for two more exhausters.

In the photograph of the meter-shed, the three station meters shown have each a capacity of 150,000 cubic feet per hour. One of these was supplied by Messrs. J. & J. Braddock and the other two by Messrs. W. Parkinson and Co. Each meter is furnished with a steam-coil; but these have never had to be brought into requisition, although the temperature has occasionally during the Sunday stoppage been very low. There is space in the shed for two more meters of the same size if required. When this and the exhauster-house were erected, there was no idea of carburetted water gas; and it was expected that the ultimate capacity of the works would reach about 15 millions—all coal gas.

It may be noted that no attempt has been made to divide these large works into sections—say, of 5 millions or so—as is usually the case; the Engineer preferring to rely upon the subdivision which is necessarily imposed by the capacity of the plant. This is a distinct departure from what may be called the traditional method of laying out works. Provision is, however, made by which, from the exhauster to the outlet of the station meter, the gas may be kept in separate streams, so as to afford a check upon the efficiency of the purifying plant.

These are a few notes which it is believed will be found interesting in connection with the photographs. We have some further particulars regarding the latest plant installed at Windsor Street under Mr. Hunt's direction; but these are being reserved for an independent illustrated article next week. It will fittingly conclude the interesting mass of information that Mr. Hunt's departure from Birmingham has suggested for publication.

The nomination of Lord Rayleigh, the Chief Gas Examiner for the Metropolis, as foreign corresponding member of the Vienna Academy of Sciences, has just been confirmed by the Emperor.

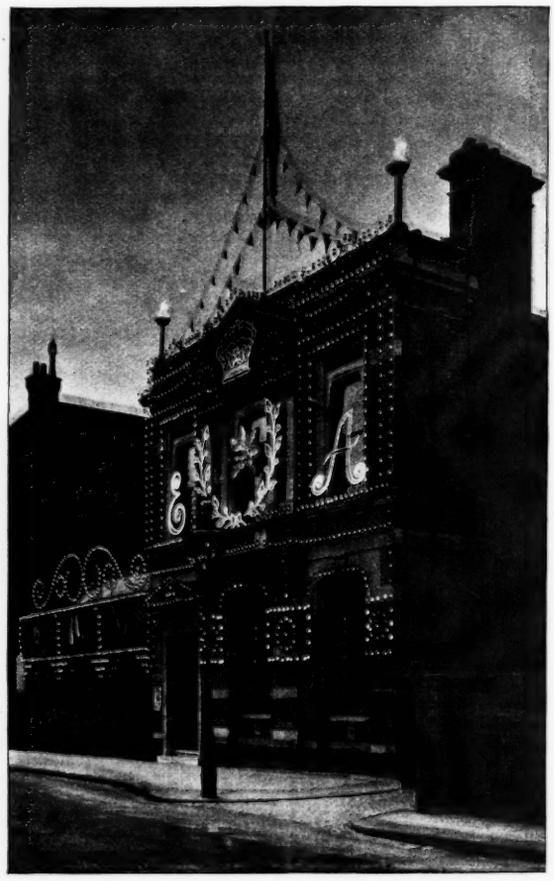
A GAS COMPANY'S ILLUMINATIONS.

THE Croydon Gas Company on Coronation night certainly did their share in decorating the borough which they serve, and did it well, as is partly seen by the two reproductions of photographs of the Company's offices, which we print this week, and which were forwarded to us by the Engineer and General Manager (Mr. James W. Helps, M.Inst.C.E.), who is justly very pleased with the effect obtained.

The photographs were taken by Mr. Helps's Chief Draughtsman (Mr. F. Harrisson), who must be complimented on the clearness and sharpness of the detail, which tell of very careful manipulation, particularly in connection with the picture of the premises by night. The first photograph was, of course, taken by daylight; and it shows the character of the illumination fittings. The night photograph, Mr. Harrisson secured by making an exposure just as dusk was setting in; and then—allowing the camera to remain in position undisturbed till after dark—he made a second exposure when the jets and devices were alight. It will be noticed that all the jets do not come out equally well; and this is due to the different colours of the globes. The part of the building to the left of the pictures is the Company's showroom; and the colour of the glass buckets on the scrolls was amber, while those on the main building were principally yellow, blue, and ruby. This is rather an interesting point; and perhaps the hint may suggest to someone the idea of carrying the experiment with the camera and coloured globes a little farther. There might be no particular value attaching to an experiment of the kind; but something of interest might result—one never knows what may turn up when dabbling in pastime investigations of this kind. However, this is merely by the way.

In the fitting up of the office, the gas supply-pipe was divided into sections, each of which was fitted with a tap, so that the gas to each could be easily regulated. This regulation is an important point in dealing with illumination work. Altogether nearly 1500 globes were used in the jet-and-glass decoration. In the centre window was a large crystal star; while the design E.R., with the crown above, and the wreath were of plain perforated copper. At the top of the building were two flamers; and at intervals these were extinguished, and coloured fires took the place of the gas-flame. The illumination was very effective, and met with general approval.

But the Company did not stop with the pretty decorative work on the offices; they went in for a display at the works, which, from the spectacular point of view, must have been very fine. The Company's 3 million cubic feet gasholder is well situated for the purpose, and up each of the 22 standards, Mr. Helps had a 1-inch pipe carried. The tops of the pipes were left open; and the result was a circle of flames some 6 feet or more high. It is not too much to say that the effect, especially from a distance, was magnificent; and on Coronation night it was particularly striking. The holder was well up at the time; and, a storm wetting the surfaces, the reflection of the lights added considerably to the effect. A rough estimate of the consumption of gas would be about 30,000 cubic feet an hour. The sight must have been a novel one for the people of Croydon; and it will be carried in memory by the inhabitants as one of the remarkable features of the Coronation rejoicings in the borough.



THE ART OF THE STREETS.

THE recent Coronation celebrations will have left a legacy of good, if the extraordinary efforts made on this occasion to beautify the streets of London and all other towns throughout the King's dominions, in their degree, should prove to have awakened in the British public the dormant sense of what is befitting in the ordinary and normal amenities of urban architecture and engineering. Readers of history and travellers upon the face of the earth—all those who either at first or second hand can claim to have some knowledge of "cities and men"—must be strongly reminded on such occasions of the varying amount of preparation deemed necessary, at different times and in divers places, for putting a fair aspect upon a public festival. We read of the heroic proceedings of mediæval towns in the matters of cleaning out and filling up the puddles in the public highway which ordinarily the common people were left to negotiate as best they could. Filthy street corners had to be swept out and sweetened; the streets were specially lighted; and even to this day, the appearance and the atmosphere of Eastern cities on the occasion of a Royal progress are understood to be very different from their usual state. Indeed, the degree of real progress in the civilization of nations is measurable by the amount of extra polish which it is deemed necessary and proper to put upon their cities, outwardly, in order to render them presentable for grand occasions. The point to specially note here is the coincident existence of a knowledge of what is usually lacking; with acquiescence in the shortcoming, in the ordinary course.

This observation does not apply to the special decoration of towns—beflagging and illumination—but to the fundamentals of all respectable "urbanity."

It is a subject upon which the townspeople of this country may legitimately pride themselves, that they have now very little to do in most cases in the way of making their main streets decent, clean, and wholesome enough for anybody, be he king or wayfaring critic. At the cost of many years of voluntary taxation for the purpose, and of ungrudging labour, British cities have been sewered, paved, and thoroughfared with a completeness and degree of excellence not so generally observable elsewhere. True, we have yet something to learn from the civic art and science of Paris, Berlin, and a few other centres of culture, as will be mentioned further on; but it is equally true that when the traveller quits these best examples, and the best parts of them, he is likely to find himself in the midst of a deplorable state of things sanitary which the most backward of English local authorities would regard as disgraceful. It is not that the responsible governments of these offensive localities have command of smaller resources than their English compeers; but the years have passed, and the money has been spent, and still the sanitation of the places remains undone. They prefer a casual sprinkle of chloride of lime to abolition of the cause of offence.

While recognizing the decency of English towns, however, as being the outcome of that wholesome preference of essentials to outside shows which one is glad to regard as thoroughly English, it must have occurred to many that a good deal of the spasmodic and special beautification of English towns for the Coronation might have been superfluous, if the permanent groundwork had only been more agreeable. The special decoration of a city which respects itself ought to be like the *parure* of a beautiful woman, or the "button-hole" in the coat of a gentleman—a last concession to the demands of a festive occasion. This is the ideal. The real is too often like the big diamond on the dirty finger of the typical Chicago alderman of American humorists. Where the Coronation festivities will do lasting good is in suggesting to those local authorities, and to the public which is interested in the matter, the desirability of having, as a regular thing, such façades, such public lamp-posts, such shop signs, such street features in general, as will not need covering up or disguising in order to make the town presentable on occasion. The idea, in short, should not be that of decorating a town out of all recognizable likeness to its every-day self, but of lending to that which is always sightly a graceful expression of what is due to an auspicious occasion. Clodhoppers cannot be converted into cavaliers by any skill of the theatrical costumier; nor can loafers be made by hap-hazard bedizenment into colourable likenesses of noble lords. The apparel, after all, does but "proclaim the man."

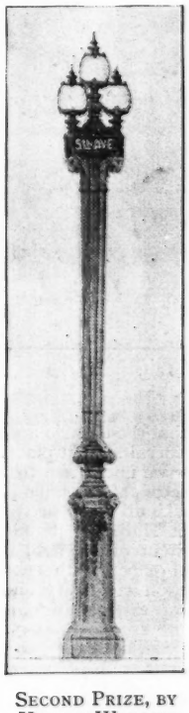
It may therefore be said of town sanitation and beautifying, that while the former must certainly be done, the latter should not be left undone. If the average Englishman concerned with public business were tested for his æsthetic sense, the result would only too frequently fall short even of the analyst's "trace." Nay, more—the atmosphere of British municipal offices, while doubtless redolent of sanitation, appears to be absolutely blighting for that civic art which actually lives and flourishes elsewhere. Our municipalities very properly get themselves organs, and have them well played, and subsidize bands, with the object of educating the people in music. They have art galleries which they support with reasonable liberality. The authorities of some of the dingiest of English industral centres go as far as they can feel their way, in fostering, in those who must lead laborious lives of monotonous toil, the appreciation for things of the Higher Life, which is one of the few positive goods of human existence. But what are the signs in the streets that Art has a measure of gratification for those who own its power even over common things? There is already the groundwork for the artistic redemption of English towns. The enterprising corner publican displays it in those fearful and tremendous outside lanterns in which his soul delights, and for which he pays huge sums to the maker. How many of these awful creations of the modern artificer exhibit the influence of the municipal art school, or are in any respect pleasing objects to look at?

Take the common matter of street name plates and direction tablets. How does the English official mind deal with such things? Does it ever enter into the perceptions of the Town Surveyor that there may be an art of these small street fittings; or would his Committee encourage him to realize it, if he suspected its existence? Critics have laughed at the municipal vanity that has led the newly-fledged Corporation of the City of Westminster to post the name of the city on street corners; but it would be more to the purpose to inquire how the service of indicating locality might be performed. There are important street junctions, for example, which the wayfarer would like to be able to identify before he has actually passed them. The accompanying figure shows how the problem has been solved by Mr. Charles R. Lamb, for the Municipal Art Society of New York. It represents an illuminated sign, in plan a truncated triangle, with the name of the cross street placed upon the two sides. The name of the main street is in front. This sign has the advantage of being legible from any position, while it is no eyesore either by day or night. The illustration is obtained from "Municipal Affairs," an American quarterly magazine, which also illustrates some other fruits of the enterprise of the same Society. The aims of this body are to supplement the work of municipal engineers on the artistic side, by procuring prize designs for some street fixture—a lamp post, a drinking fountain, a sanitary dust-bin, and so forth. The example is one that might be copied. The prizes are of quite sufficient value—say, £100 for a refuge lamp-column—to attract good designers; and the Society undertakes to carry out one of its premiated designs, and so erect and give to the city every year some one good thing which shall serve as an incentive to further

Triangular Street Sign—Borough of Manhattan.

endeavour in the way of permanent beautification of the streets. Lamp-columns are difficult subjects. The accompanying design by Victor A. Ciani, although it took the first prize in the latest competition, is not very engaging. The altar-like character of the base is too much accentuated, and the shape of the shaft is unpleasing. Still, it is an effort that deserves recognition. The second design, which is triangular in plan, is not bad; but it nevertheless has obvious defects. Its shaft tapers the wrong way.

First Prize, by Victor A. Ciani.



Second Prize, by Henrik Wallin.

These American Municipal Art Societies are copied from Paris, where advertisements, street building frontages, and other civic activities in construction, are judged for substantial prizes. The "Builder" for the 23rd ult. gave a picture of a prize house-front built of armoured concrete upon the Cottancin principle, faced with glazed tiles, which is a remarkable achievement. We cannot reproduce the illustration here, and it is impossible to conceive of it as a representation of anything that could be built in England. But the point to be noted is the exemplification

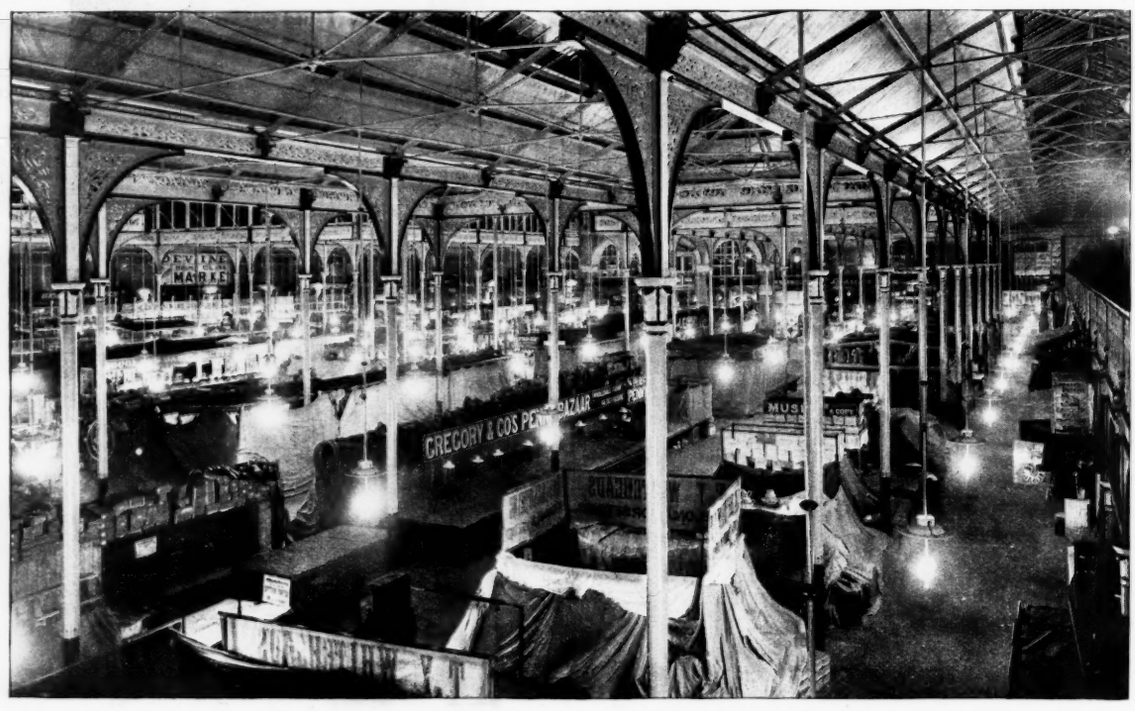
of the premium system, with its encouragement of talent. The truth of the matter is that in France it can be said without absurdity that "everybody is a bit of an artist;" whereas by no stretch of the probable could such a remark be made locally applicable in England. Not that English people are incapable of, or are insensible to, Art—far otherwise, indeed; but it has become customary to look for what is artistic only in the form of a painting in a gilt frame and hung upon a wall. Lamp-posts, like corporation maces and mayoral chains, are designed and manufactured by joint-stock companies, never by individual craftsmen; and consequently they are shop goods. This is certainly of the things they do better abroad.

THE LIGHTING OF MARKET BUILDINGS.

An Interesting Photograph.

It goes without saying that all places in which buying and selling are carried on should be brilliantly, without being dazzlingly, lighted, and not only so but suitably lighted. Fitness and brilliance do not always go hand in hand; and there is a well-defined distinction between the one and the other. Therefore, in choosing a method of lighting, suitability should be studied along with cost and lighting power; but it is not always. A brilliant light serves to attract attention; and in this respect is an excellent advertisement. But if the advertisement ends there—if it does not serve its ultimate purpose of inducing people to spend—then it is of little use.

A paragraph published in the "Journal" on Aug. 12, under the heading of "Marketing under Electric Arcs," explains our meaning. It mentioned an experience in the Birmingham Market House which was observed on a Saturday evening—Coronation night, in fact—when the place was crowded with people on shopping bent. The building was brilliantly lighted by an imposing array of electric arc lamps; but it was noticed that many stall-keepers had their stands also illuminated by flat-flame gas-burners. This struck one as strange; but inquiry yielded a useful little lesson on the point as to the necessity of a light being not only good in illuminating power, but suitable for its purpose. The use of the flat-flame gas-burners, it was pointed out, had for its object the intercepting of the blue rays of the electric arc lights, which gave to the fruit, flowers, and meat a peculiar hue which spoilt their fresh appearance, raised doubts, and caused people to hang back from investment. The standholders thereby suffered; not would-be customers. However, this being the case, it presents an anomalous condition of affairs—one light having to be employed to undo the work of another! Did ever anyone hear of a more curious condition of things in connection with artificial lighting? The moral of this Birmingham experience is that it is better and more sensible to adopt a light which needs no tampering with to make it effective for particular purposes. It is



The Market Hall, Bolton, Lighted by Keith's High-Pressure Burners.

clear that the electric arc light is not the best for the illumination of a general market place.

Now we undertake to say that the complaint of some of the proprietors of the stalls in the Birmingham Market House would not be heard from the stall proprietors in the Bolton Corporation Market Hall, the illumination of which—taking into account the extent of the hall, the abundance of the illumination, the cost of effecting the change from the flat-flame state to the perfection in quality and power of high-pressure lighting, and the low expense of obtaining such a great increase of light—must be unique among similar establishments in this country. In Bolton, both the gas and the electric light undertakings are Corporation property; and therefore—the electric works being the newer enterprise—it is a piece of good evidence of the Corporation appreciation of what gas can do in the way of high-power lighting in competition with electricity to find that, on the conversion of the lighting of the building, gas was retained as the source of illumination. We have previously briefly referred to this installation of high-pressure gas-lights; but the recent reference to the lighting of the Birmingham Market House, and the photograph of the Bolton establishment (taken at night time without any external light being brought to the aid of the gas-light), together revive interest in this remarkable illustration of the powerful illuminating property of gas. The system adopted is that of the James Keith and Blackman Company, Limited. In the hall (as pictured above) there are no less than 246 lights; but there are half-a-dozen others fitted in the Fish Market. The installation had to be adapted to the old circumstances, so that it is not exactly what would have been put into the building if the Company had had the entire renewal of the existing fixtures, or were entering into a contract for the fitting up complete of a new building. For example, the burners are merely connected to the old fittings, and are encased in globes of the ordinary type, instead of being put in specially constructed lanterns. Of course, all the piping and pendants being in position, it would have been a pity to discard them merely for the sake of the little differences between what existed and what would have been done if they had not existed. Each pendant is fitted with two of Keith's high-pressure burners, and consequently with two globes. Then the lights are situated only 18 feet apart; and for double lights of the intensity of these, this is closer than they really need be. But, as said previously, circumstances ruled in the placing of the lights; and first-cost was a point to be considered.

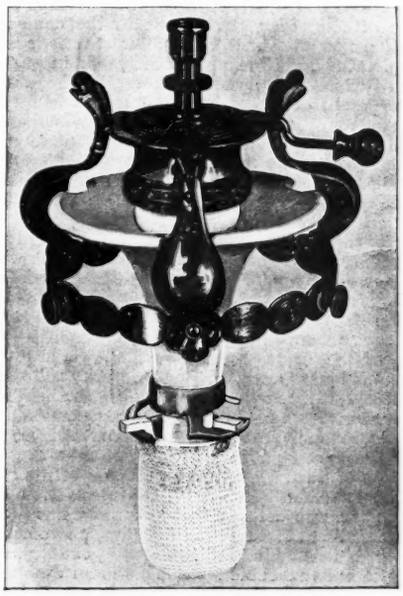
As "Journal" readers have before been told, with the Keith high-pressure burner, an illuminating power of 300 candles is obtained with a consumption of 10 cubic feet of gas supplied at 8 inches pressure; so that the total illumination from the 252 burners is equal to little short of 80,000 candles. This means that, with gas at 2s. 6d. per 1000 cubic feet, a 1000-candle power light is obtained by the expenditure of 1d. an hour; and the total consumption being approximately 2520 cubic feet, the cost of the

lighting of the market in this brilliant style can be easily ascertained. Six Keith compressors are used to raise the pressure of the gas. But again the circumstances of the place necessitated the installation of more compressing power than would have otherwise been required to deal with the number of burners in use; and, of course, the number includes stand-bys.

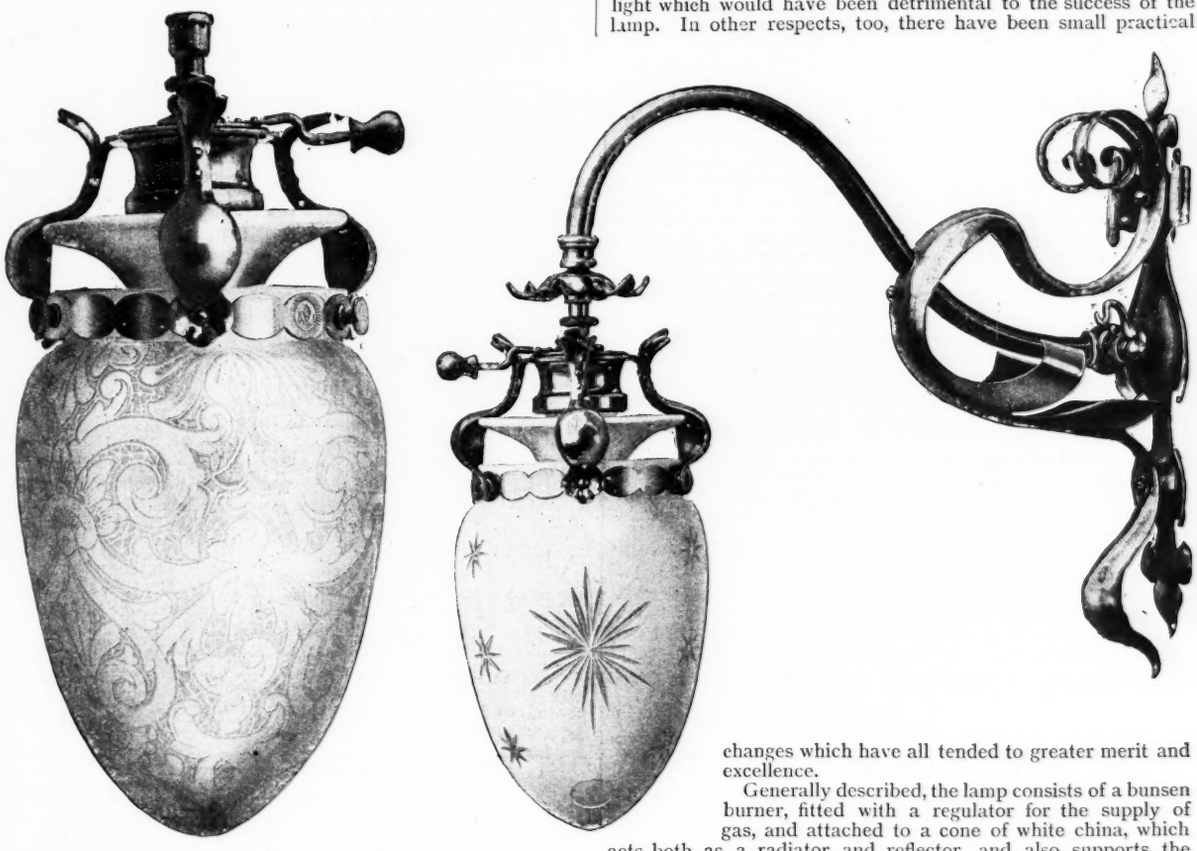
Now with regard to the photograph, it is a testimony to the richness of the lighting of the market. It was taken at ten o'clock at night, on May 15 last, with a six minutes' exposure. It is a really splendid example of photographic work taken by artificial light and under such circumstances; in fact, we do not think it would be possible to show a picture of an extensive exterior taken by artificial light that would excel this in the perfection of its detail. If it is examined carefully, this and that the light is splendidly diffused throughout the place must be admitted. The ornamental work of the girders supporting the roof is beautifully defined, which shows the excellence of the top illumination, and the sharpness of the printed announcements on the stands themselves is evidence of the good quality of the illumination at the level at which it is most needed. From roof to ground, there is uniform illumination; and the photograph shows that it penetrates into every little recess. There is no need here for the standholders to introduce another light to intercept the rays from the high-pressure gas-lights through illusory but harmful detraction from the appearance of the goods exposed for sale, as under the electric arcs at Birmingham. The light is attractive in its abundance, excellent in purity and tone, and cheap.

THE PERFECTION OF THE INVERTED INCANDESCENT BURNER.

For the past twelve months or more, we have been watching with no small interest the efforts of the Inverted Incandescent Gas-Lamp Syndicate, of 16-20, Farringdon Avenue, E.C., to improve the inverted incandescent burner to a point at which they could put it forward with an assurance that its adoption would give complete satisfaction to users, and a hope of meeting with commercial success. That point has, in their judgment and ours, now been reached. The difficulties which fell in the way of perfection have been few, and to the onlooker small; nevertheless, they have been (as is the way sometimes with what appear to be insignificant things) somewhat troublesome. It was, however, necessary to surmount them; and the reward of perseverance has come. We cannot help admiring the dogged manner in which the Syndicate have persevered in their work to obtain an article which would give good results, and their determination not to hazard the future of the invention by placing the lamp on the market before they could do so with confidence. Originally, the chief difficulty was in the contest to obtain the reversal of a natural order of things—that is to say, in getting a flame to burn downwards with the steadiness and constancy essential to success, and to overcome the trouble of the bunsen burner lighting-back. A patent cone (about which we shall have something more to say presently) has vanquished these troubles; and improvements effected within



the past few months have cured a disagreeable fluctuation in the light which would have been detrimental to the success of the lamp. In other respects, too, there have been small practical changes which have all tended to greater merit and excellence.



Generally described, the lamp consists of a bunsen burner, fitted with a regulator for the supply of gas, and attached to a cone of white china, which acts both as a radiator and reflector, and also supports the mantle. The whole arrangement is merely screwed on to the fittings specially manufactured for the purpose, or, if it is to be used on existing fittings, a junction-piece is supplied. In the head of the lamp nearest the connection with the fitting, of course, comes the bunsen burner. Then there is an air-regulator; and this is formed of a perforated disc with a movable diaphragm above. By its means, the air supply can be controlled to a nicety for any quality of gas used. Beneath is attached the china cone which at its upper part is splayed outwards, and then descends first with a sharp curve and then a gradual slope to the foot where connection is made with the mantle. The curved top of the cone has a twofold use. It protects the burner and all above it from the direct current and

action of the heat, and it also deflects the products of combustion in a lateral direction through the annular space formed by the globe support and the curved mouth of the cone. Therefore the complaint of the blackening of ceilings by direct upward current as in the case of ordinary gas-burners will not hold good with this inverted burner. But the main use of the cone, as has been explained, is to prevent the lighting-back of the burner. The method of connecting the mantle to the cone is accomplished by means of a bayonet joint. The mantle is made with, and is strongly attached by asbestos string to, a magnesium ring, on the top of which are three catches. In the old style of burner these catches connect with a brass piece fitted on the cone; but the cones are now being made with lugs cast on them, and so the bayonet joint is secured without any provision being made external to the cone.

The mantles are specially made, and after being accustomed to the elongated cone-shaped mantle these have a curious appearance. Over-all they are only 2 inches in length, of an equal diameter throughout, and finished off with a rounded head. They are strongly made; and breaking away (which was at first a difficulty) has been, we are informed, entirely overcome. The flame that is given by the burner is of a well-defined and interesting character; but the most remarkable thing about it is that so much flame as is given can be concentrated—as it is—within the small space of the mantle. To this fact, we are under the impression, must be largely attributed the purity and whiteness of the incandescence of the mantle, for in none of the lighted mantles (and there were several) which were under inspection at the time of a recent visit to the Syndicate's show-rooms could anything but intense incandescence be detected from base to head. With such a concentration of heat, some fear for the life of the china cone might well be felt; but here again the information was given that the cones are fireproof, and that long usage has proved their heat resistance. As to the duty of the lamps, photometrical tests attribute to them an illuminating power of 55 candles, with a gas consumption of only 2·8 cubic feet. This is an excellent result. To light the burner a bye-pass can be used; but, in its absence, the best plan is to apply a light simultaneously with the turning on of the gas.

The globes used are made of various shapes, are decorated in many styles, and are artistic productions of the first order. They are suspended from the top, and are made to give an air supply either direct from the base, or from side perforations near the base. With the latter, there need be no apprehension of danger in the event of an accident to the mantle, as any dropping fragments would be caught in the bottom of the globe. No chimneys or mantle rods are required; and their absence removes a source of danger to the mantles. One other point which must not be lost sight of is that the full power of the light is directed downwards; and the whole of the fittings being above the light, there is an entire freedom from shadow.

Now, in this inverted lamp we have a novelty, and something more. Besides standing unique among gas-lights, it is a useful, economical, and efficient invention. It places in the hands of the gas manager a fitting which will be of the greatest service as a card to play off against the boastful claim of the electrician that he holds the best means among the systems of lighting for obtaining the greatest artistic effect. With the inverted burner the gas manager can measure swords with him over that claim. It also offers an advantage that electricity cannot do—and that is, a ready means, without occasioning the slightest disorder in a house, of converting existing fittings into handsome illuminative ornaments, which answer their primary purpose of lighting agents in a manner that is economical in the expenditure of gas and highly efficient in the duty afforded. The incandescent mantle brought in its train some beautifully designed gas-fittings—notable among them being the "Surprise" pendants and "Simplicitas" brackets and pendants; and now the inverted burner, we believe, will be an invaluable aid in further promoting the popularity of gas against competitors in refined interior lighting, where effect is as much an inducement to use as high illuminating power. But here we have both—the effect and the high lighting power—with economy as an additional benefit. And what more can be wanted? We have examined a number of the lights, and are satisfied that all that is stated here is true. We cannot, of course, go so far as to pledge ourselves that extended use will not detract from the good character given to the lamp; but the makers assure us that they have no fear of disappointment on that score. Having looked forward to the coming of the inverted incandescent gas-lamp, we now wish it every success.

Artificial Lime Sandstone.—This artificial stone is made by mixing hot sand with quicklime in powder; a certain quantity of water being added at a temperature a little below boiling-point. Then the mixture is spread in a closed vessel until the lime is quite slaked, and it is again heated with superheated steam. The material which has become pulverulent is, according to the method of moulding employed, immediately treated, before moulding, with steam in a mixer. It is then conveyed into the hardening apparatus, and treated with the fumes of hydrofluoric acid to dissolve the quartz of the sand. It is claimed for the artificial stone thus produced that it will withstand the effects of water, air, and fire.

PERSONAL.

The position of Manager of the Wicklow Gas Company has been filled by the appointment of Mr. ROBERT GAULT.

Mr. R. NELSON, Assistant-Manager of the Hexham Gas Company, having accepted an appointment with the Whessoe Foundry Company, Limited, of Darlington, was last Friday evening presented with a case of drawing instruments by the Company's employees. The presentation was made by Mr. Herbert Lees, Engineer and Secretary of the Company.

Mr. WILLIAM THOMSON, Assistant to Mr. G. R. Hislop, Engineer and Manager of the Paisley Corporation Gas-Works, who, as announced last week, has been appointed Manager of the gas, water, and electricity undertakings of the Corporation of Kendal, is a son of Mr. James Thomson, Manager of the Inverness Corporation Gas-Works. He was trained as a mechanical engineer in the workshops of the Highland Railway Company at Inverness, and then served three years under his father, after which he obtained the appointment he is now filling in Paisley.

Mr. JOHN HOLT, of Greenwich, has been appointed Outdoor Superintendent and Public Lighting Inspector to the Glastonbury Corporation Gas Department, and will control the whole of the system of Glastonbury and Street. For the past two years Mr. Holt has had entire charge of the distribution and fitting department at Street, during which time the number of consumers has nearly trebled. He, however, attributes this result entirely to the system of supplying free fittings adopted by the Corporation, and not in any way to his influence. At the same time, it is due to him to record the fact that since he has been engaged in the district he has won for himself the good feeling and high appreciation of all; and the best wishes are expressed for his success in his new appointment.

Of the 63 applicants for the appointment of Engineer and Manager of the Doncaster Gas-Works, in succession to the late Mr. Robert Bridge, six were requested to appear before the Gas Committee on Monday last week. The result was the selection for the position of Mr. ROBERT WATSON, Manager and Secretary of the Hertford Gas Company. Mr. Watson was formerly Assistant-Manager of the Newbury Corporation Gas-Works, and has for the past seven years had entire charge at Hertford. During this time he has greatly improved the works; having put up a new retort-house with regenerative settings, and added washing and scrubbing plant, purifiers, &c. The nature of his work in the Company's district was shown in the paper he read before the Gas Institute at Southampton; and his engineering capabilities, by his communication to the Southern District Association at the November meeting in 1897. Mr. Watson holds the certificate of the City and Guilds of London Institute, with first prize and the silver medal, in "Gas Manufacture." His labours at Hertford have been very successful; the make of gas having increased some 50 per cent. during his managership. It is now nearly 40 millions per annum. We cordially wish him success in the larger sphere in which his work will henceforth be carried on.

OBITUARY.

The many friends of Mr. George R. Hislop, of Paisley, will, we are sure, unite with us in sympathizing with him in the bereavement he has just sustained by the sudden death of his third daughter, MAGGIE BROWN STEWART, which occurred at Davaar, Biggar, on the 28th ult. The interment took place on Saturday, in Biggar Churchyard.

We learn, with much regret, of the death, on the 21st ult., at Church Fenton, of Mrs. WARNER, wife of Mr. W. J. Warner, late Engineer of the South Shields Gas Company. The deceased lady, who had been in failing health for some years, had derived considerable benefit from her change of residence to the milder climate of South Yorkshire. Recently, however, Mrs. Warner had a somewhat serious attack of double pneumonia, but appeared to be getting fairly strong again, when quite suddenly dropsy supervened, and caused death within comparatively a few hours.

The annual congress of the Sanitary Institute will be held in Manchester from the 9th to the 13th inst., under the presidency of Earl Egerton of Tatton. Among the subjects to be discussed are "Village Water Supplies" and "The Collection and Storage of Flood Waters and their Purification." In connection with the congress there will be held, as in previous years, a Health Exhibition, in St. James's Hall—to remain open till the 27th inst.

In the recently issued report of the Principal Chemist of the Government Laboratory (Dr. T. E. Thorpe) on the work of the laboratory in the year ending the 31st of March last, it is shown that eighteen samples of patent fuel, and of the pitch, coal dust, and pitch coke employed in making it, were examined in connection with the duty on exported coal. The fuel was found in most cases to consist approximately of 90 per cent. of coal, and 10 per cent. of pitch, &c.; and the duty was charged on the coal only, at the rate of 1s. per ton.

NOTES.

Fresh Uses for the Electric Furnace.

The commercial difficulty of making a good use of the electric furnace suggested the holding of a "symposium" on the subject by the American Institute of Electrical Engineers. The products of this kind of furnace were stated and discussed by Mr. C. B. Jacobs, who agreed that the best known is calcium carbide. Unfortunately, the commercial use of this product is limited to the preparation of acetylene; and the market is oversupplied. Mr. Jacobs suggested that calcium carbide may attain greater importance as a reagent in manufacturing chemistry than for its more familiar application. It is a powerful dehydrating agent, and may come into extensive use for extracting moisture. The silicides of calcium, barium, and strontium are formed in the electric furnace at somewhat higher temperatures than those required to produce the carbides, the silicides decompose with water, and yield free hydrogen in a pure state. The question would then be, to find a profitable application for pure hydrogen. It was remarked in the course of this discussion that such a use for the silicides might be found in the steel industry, through their action on sulphur and phosphorus. By the application of these silicides to an iron high in sulphur and phosphorus, a steel has been obtained without any trace of these impurities.

Steam Consumption of Turbine Engines.

As there is not an over-abundance of information current with respect to the steam consumption of turbine motors, or the value of superheating, it is worth recording that a short time ago Messrs. Dean and Main, of Boston, made an exhaustive series of tests of a 300-horse power De Laval turbine used for generating electricity, to be utilized in driving the tools of an engineering works at Trenton, New Jersey. (This turbine, it may be remembered, was described by Mr. W. D. Child, of Romford, in the paper read by him at the last meeting of the Gas Institute, and given in the "JOURNAL" for June 17, p. 1654.) The steam was supplied by Babcock and Wilcox boilers equipped with superheaters, made by the boiler company. The details of the tests are published in the "Engineering Record;" but it is sufficient to know that with superheated steam, 13·94 lbs. were consumed per brake horse power per hour, and with saturated steam 15·17 lbs. per brake horse power per hour—the saving from the superheating amounting to 8·8 per cent. The amount of superheat was 84° Fahr. The boiler pressure was 200 lbs. per square inch, and one boiler did the work. The comparison of superheated with saturated steam was easily made, as with the Babcock and Wilcox arrangement the superheater can be thrown out of use at any time, and the pipes constituting it filled with water to add to the water-heating capacity of the boiler. The turbine was worked condensing, by connection with a Worthington injector condenser. The efficiency is regarded as satisfactory.

Slow and Rapid Setting of Plaster.

A very interesting study has lately appeared in the "Génie Civil" respecting the conditions for setting of plaster in water, from the physical and chemical points of view. Crude gypsum, as is well known, is calcium sulphate ($Ca\,SO_4 . 2H_2O$), and it has a solubility of 2·36 grammes per litre. The burnt plaster, in contact with water, gives a supersaturated solution containing 10 grammes of calcium sulphate per litre. In the course of setting, the hydrates contained in the plaster are dissolved with their peculiar speed of reaction, and contribute to form a supersaturated solution as far as regards the permanent modification $CaSo_4.2H_2O$, in which crystallization occurs. The causes of slow or rapid setting are found solely in the greater or less amount of one of these hydrates; and the questions of the nature of the gypsum, crushing before burning, &c., have no influence. The writer confirmed these assertions by a series of experiments during which two pieces of the same piece of gypsum gave, after suitable treatment, two plasters setting in from 3 to 25 minutes respectively, though similarly gauged. If the different hydrates in question can be formed in important quantities, the problem of setting will be solved, and it will be possible to manufacture quick and slow setting plasters. Reduced to its most simple general expression, the question may be put as follows: To be transformed into plaster of a definite setting power, a given gypsum must be treated during a certain time and at a given temperature. These results, once in the domain of practice, will make it possible to treat plaster like other analogous materials—cement and lime—by assigning it conditions for setting, resistance, and homogeneity which hitherto, owing to want of data, could not be taken into consideration.

Preparation of Preservative Paints.

The nature and properties of the preservative paints used to prevent the corrosion of structural ironwork has again been discussed in "Engineering." While it is admitted that painting holds the first place as a preservative of ironwork, it is also confessed that there is not a paint in existence which is absolutely perfect for this use. Paints are chiefly ground in linseed oil, which is specially refined for the purpose in order to eliminate the waxy matter and reduce the proportion of oleic acid. This refining process may be conducted in a variety of ways, of which the best is ageing the raw oil by allowing it to stand undisturbed for at least two years. The albuminous and waxy matters then settle as a muddy sediment. Boiled oil is the residue after heating to 610° Fahr, which dispels the oleic acid in the form of acrid fumes. This product is condemned as having lost the original good qualities of the oil as a vehicle for compounding with pigments to make paint. What it makes is classified as a poor quality of resinous varnish which is pervious to air and moisture. Such paint becomes non-adherent, and is washed away by rain. The effect of the addition of driers, such as lithage, is to saponify a portion of the fatty acids, and to absorb the glycerine, which is thereby expelled. A salt of manganese (either the sulphate or the borate) is preferable to lithage for this purpose, because the former make hard insoluble soaps with the fatty acids. Even so, they do not absorb all the liberated glycerine, a great deal of which may be removed by steeping in the mixed paint strips or sheets of gelatine previously slightly softened with water. The best paints are those compounded with an active basic pigment, which will combine with the fatty acids of the vehicle, such as (in the order of hardening quality) red lead, red oxide of iron, white lead. For a white paint, zinc white and silicate of soda (40° to 60° Baumé) is commended, mixed to a suitable consistency.

Gasolene and Kerosene.

Herr L. Berger states that the so-called "petrol," or gasolene, ordinarily employed in explosion motors, is a petroleum distillate with a specific gravity varying between ·680 and ·710 (76° to 68° Baumé). The boiling-points of gasolene of these two densities are 149° and 194° Fahr. The vapour of gasolene that forms over the fluid is chiefly pentane, of sp. gr. ·640; but the liquid gasolene consists of a mixture of hexane and heptane. Taking a sample of gasolene having a specific gravity of ·683 and a boiling-point of 154° Fahr., the composition by weight was found to be 80 per cent. hexane, 18 per cent. heptane, and 2 per cent. pentane. The chemical composition of this gasolene was 83·8 per cent. carbon and 16·2 per cent. hydrogen, from which the fuel value can be computed. The differences between this fluid and a kerosene can be appreciated from the statement that kerosenes vary in specific gravity from 1·760 to 1·820. The former is the exceptionally light kerosene of Pennsylvania. It has a boiling-point of 302° Fahr.; while the boiling-point of the heavier kerosene is 536° Fahr. Kerosene begins to give off vapour noticeably at a temperature of about 104° Fahr.—a vapour which is chiefly nonane. Liquid kerosene is a mixture of decane with a little hexadecane. Average kerosene is almost all decane, with a specific gravity of 1·770. The combustion of average gasolene in air results in the production of 11,086 calories per kilogramme, with a theoretical temperature of 2300° C. Kerosene yields by computation on the same basis 11,000 calories per kilogramme, and a temperature of 2324° C. In these regards, therefore, there is not apparently much to choose between gasolene and kerosene; but there is a great difference in the proportions of air required to give the strongest explosion with the two kinds of vapour. The proportion of gasolene vapour to air is 2·15 per cent.; while that of kerosene vapour is 1·35 per cent. The kerosene also requires to be vaporized by a temperature of hot plate of 220° C., compared with 82° C. for gasolene. Hence the difficulty of working with the heavier hydrocarbon.

A Useful Book of Tables.—We have received from the Fairbanks Company a little book of tables they are publishing for converting American dollars into English pounds. It frequently happens that firms having business relations with America are obliged to refer to American catalogues and price lists; and these tables will be found of special use on such occasions. The amounts in dollars are printed in black, and the English equivalents in red figures; and they range from 1c. up to $5000. Appended to the tables are some notes on the metric system, with a few simple rules for converting metric measures and weights into English. The book is of convenient size for the pocket; and we should think it would be found useful.

Italian Gas Society.—The annual meeting of the Italian Gas Society (which had been originally fixed for July 21) at Turin, has been postponed until the 20th of the present month, owing to the death of Signor Cav. Leone Mariani, the General Manager of the "Società Italiana per il Gas" in that town. The meetings will not be held in the Company's offices, as intended, but in those of the other Gas Company in Turin—viz., the Società Consumatori;" and, under the circumstances, the social attractions will be limited only to the usual annual dinner of the members. The technical proceedings will be chiefly taken up with a consideration of the Committee's report on the means to be adopted to increase the interest of younger gas engineers in their work (which was referred to in the "JOURNAL" for May 27 last), and with a discussion on a Bill relating to the municipalization of public services, which is being introduced by certain politicians in the Italian Chamber of Deputies. Though the meeting under the presidency of Signor Ing. Beria (of Turin) will take place this year under somewhat saddened conditions, we nevertheless hope the gathering of the Italian gas managers will prove interesting and profitable.

TECHNICAL RECORD.

INSTITUTION OF GAS ENGINEERS.

The Autumn Meeting.

We have received from the Secretary (Mr. Thomas Cole) the official programme for the autumn meeting of the Institution of Gas Engineers to be held at Halifax—as arranged by the President, Mr. Thomas Holgate, M.Inst.C.E., F.C.S.—on the 11th and 12th inst. An indication of the nature of the arrangements was given in an editorial paragraph in the "JOURNAL" last week; and to this there is nothing to add. Following the programme, however, are descriptions of the gas and water works, which will be visited; and from these we take the following particulars.

The works are situated at the junction of the Lancashire and Yorkshire and Great Northern Railways, near the Central Station. They are intersected by the Hebble Brook and also by the Halifax and Ovenden Railway. The land forming the gas-works site varies considerably in level; and while this irregularity has caused the construction of the works to be expensive, certain advantages accrue in the reception and treatment of the raw material. The works, which until recently occupied the south-east corner, were constructed about the year 1863 by the late Mr. George Wilson Stevenson, who was at that time Gas Engineer to the Corporation. The retort-house at the northern end of the works was erected during the term of office of the late Mr. William Carr. The newer portion comprises an inclined retort-house, containing forty beds of sixes, each 26 in. by 16 in. in section. In this house is installed one unit of carburetted water-gas plant, capable of producing a million cubic feet of gas per day, and which is arranged to receive hot coke from the inclined retorts. The coal comes in at the east end of the retort-house, and is thence elevated and conveyed into continuous hoppers. The coke is removed by De Brouwer conveyors into rotary screens, placed upon hoppers capable of holding 300 tons. Space is left for another retort-house, which will complete the available capacity of the present site.

Contiguous to the retort-house are the boilers, exhausters, and pumps, housed in buildings covered by a cast-iron cistern divided into sections for tar and water. The boilers are fitted with Musgrave's superheaters, and a Green's economizer is at present being installed. The condensers are of the vertical annular type. The relief holder for the water-gas plant is of small capacity, serving only to equalize the variation during each run. The scrubber, which is 50 ft. by 20 ft. and 90 ft. high, is divided into four sections, three of which are supplied with ammoniacal liquor, and the fourth, which is 10 ft. by 10 ft. cross section, is filled with clean water. The scrubber is supplied with ammoniacal liquor in large volume by means of a triple-expansion, three-throw pump.

The purifiers are four in number, each 57 ft. by 38 ft. in plan, and 10 feet deep. The purifying-house has an upper floor for the storage of oxide, and the floor beneath the purifiers acts as a storage for spent lime. The roof of the purifying-house is composed of girders 9 ft. 6 in. deep and 60 ft. long, which carry on the bottom boom the revivifying floor, and on the top boom the light framework for the slating. Oxide of iron is elevated from the lowest floor to the top portion of these girders, and then distributed by a conveyor throughout the length of the building. Where the purifying-house crosses the Hebble Brook, large girders and standards have been required for the carrying of the superstructure.

In the second section of the works is to be seen the retort-house, consisting of twenty beds of nines, each retort 22 in. by 16 in. in section. These are worked by compressed air stoking machinery, recently put in to take the place of manual machines. The governor-house, governors, station meters, and lime purifiers for this section have been constructed within recent years.

Upon the gas-works site only one small gasholder is provided, as the principal storage is at the Stoneyroyd gasholder station, about three-quarters of a mile distant—the gas being delivered there by means of an exhauster.

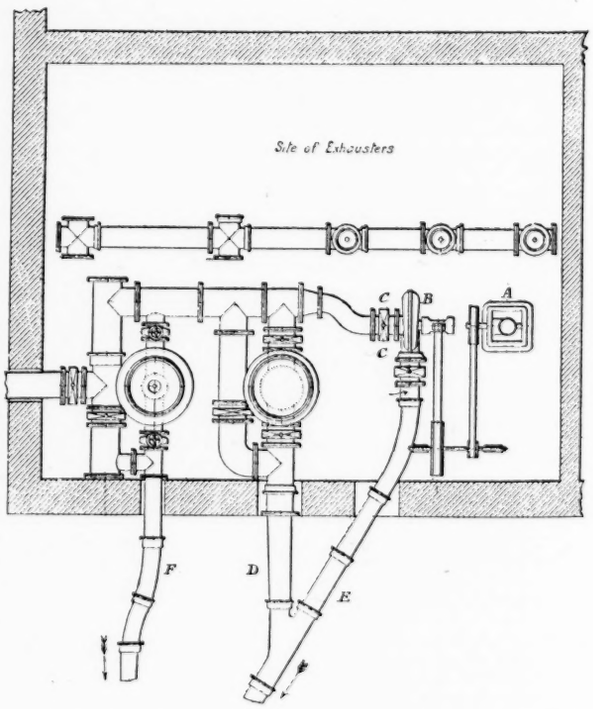
On the western portion of the works is erected the sulphate of ammonia plant, with which is combined plant for the purification of ammoniacal liquor. The waste gases from this plant pass into a Claus sulphur kiln. On the easterly side are erected the tar-works, the central feature of which is the continuous still, invented by Mr. F. Lennard, of Messrs. Forbes, Abbott, and Lennard, Limited, which has been described in the "JOURNAL." The railway siding of the Corporation communicates with these works, and the pitch is loaded into trucks by means of a locomotive crane. Adjoining the tar-works are the oil-storage tanks connected with the water-gas plant. The oil runs by gravity from the siding into the tanks, and by gravity from the tanks into the generator room. The site of the tar-works and oil-storage tanks has necessitated the erection of retaining walls, which have been economized in thickness by placing buildings endwise thereto.

The total make of the Halifax Gas-Works was last year 872 million cubic feet, and the illuminating power of the gas 18·49 candles. A Referees' table photometer, fitted with a 10-candle pentane standard, will be fixed in the corridor of the office, testing the illuminating power and consumption of gas of an incandescent burner, as foreshadowed in the Inaugural Address of the President at the May meeting.

Passing on to the new water-works, there are three reservoirs—the upper, the middle, and the lower—at Walsham Dean. The top water-level of the upper one is 1100 feet above Ordnance datum, of the middle one 1043 feet, and of the lower one 985 feet. The capacity of the upper reservoir is about 213 million gallons; of the middle one, about 266 million gallons; and of the lower one, 141 million gallons. This gives a total of about 620 million gallons, which is about equal to the capacity of the existing Widdop reservoir. The total drainage area—which is entirely moorland—down to the lower embankment, is about 2200 acres. The supply to Halifax from these works will be about 2 million gallons per day, besides the compensation water to be sent down the stream, which will be about 1½ million gallons per day. The first sod was cut at the lower reservoir by Mr. Alderman W. Brear, on Sept. 17, 1900, and the tramway to the works was started at Dawson City on the 17th of the following month. Work at the reservoirs was not commenced until January last year. The contract has to be completed by April 2, 1905.

AN INSTALLATION OF GAS-COMPRESSING PLANT.

At the last Meeting of the Société Technique du Gaz en France, M. Bouvier gave some particulars in regard to the Sturtevant fan gas-compressor which has been installed at the Lyons Gas-Works. The conditions which led to its adoption were the following: It was found to be necessary to send through the principal trunk main (a 12-inch one, 1¼ miles long) between the works and the city something like 60,000 cubic feet of gas per hour, with a possibility of an increase to 78,000 cubic feet during the nights of heaviest consumption in winter. Additional pressure up to 6½, and even to 7½ inches, had been put on; but this was attended with inconvenience. There were three ways of meeting the difficulty. The first was to duplicate the main, at an estimated cost of 75,000 frs. (£3000); the second was to fit up, just outside the city, an exhauster-room, with a gas-engine and exhauster, at a cost of 30,000 frs. (£1200), exclusive of the cost of motive power, attendance, &c.; and the third—suggested by the Manager—was the installation of a fan compressor on the works. This suggestion was adopted; and the plant was put up, at an outlay of 5440 frs. (£218). It was the first of the kind erected in France, and it has given the greatest satisfaction. The arrangement is shown in the accompanying illustration, in which A is the steam-engine, working the fan B, C the governors, D the principal trunk main, with its feeder E, and F the second main.



Running at the rate of 4700 revolutions per minute, the machine compresses the gas to 16 inches, assuming its specific gravity to be equal to ·42 that of air. The inlet-pipe and valve are 10 inches in diameter. The former is connected with the general outlet-pipe or collector, which is 16 inches (afterwards reduced to 12 inches) in diameter. It will be noticed that there is a second

outlet-main; but it feeds a set of distributing-pipes, which do not require to be served at high pressure. The outlet-pipe from the fan is also 10 inches in diameter, and is connected by a conical piece with the principal main. The steam-engine is of 5-horse power. During the times of the heaviest consumption, the compressor delivers about 70,000 cubic feet of gas per hour.

Accompanying the paper were two diagrams showing the effect of the action of the compressor in clear and dull weather respectively. In each there were three curves, showing the pressure as recorded (1) at the outlet of the compressor, (2) at a point in the city about 800 yards from the junction of the feeder with the principal main, and (3) at the lowest point in the district. In the diagram relating to clear weather, the first trace is very steady until five o'clock in the afternoon, when it suddenly rises from 2 inches up to 7 inches, where it remains till seven o'clock, when it gradually falls until at midnight it is at its former level, at which it remains till five o'clock next morning. In the two other traces, with the exception of a rise of about 4-10ths just after five o'clock, there is practically no variation. In the dull-weather diagram, the first trace makes its upward bound at four o'clock, and begins its descent at seven; dropping to 18-10ths at midnight, and remaining thereat till close upon six o'clock next morning. During these hours, the other two traces show but little variation, except a slight rise between five and six o'clock. It will thus be seen that, notwithstanding the greatly increased pressure at the works resulting from starting the compressor, the pressure at the consumers' burners and the public lamps is unaffected. It remains steady, whether the appliance is at work or at rest. Such an installation therefore offers a ready means of increasing, as may be desired, the initial pressure and velocity of the gas on its entrance into the outlet-pipes, and also of economically sending high-pressure gas to a considerable distance for the supply of a special district or for filling a holder. M. Bouvier pointed out that to achieve the best results the compressor selected must be well made, and its working parts accurately balanced. These conditions fulfilled, it would be capable of rendering valuable service in gas-works.

THE ACTION OF FERROUS THIOSULPHATE ON SULPHURETTED HYDROGEN.

In the course of the notice in the "JOURNAL" for Aug. 12 of the annual report of Mr. R. Forbes Carpenter, the Chief Inspector under the Alkali Works Regulation Acts, brief reference was made to a series of experiments carried out by his Assistant (Mr. Linder) in connection with the above matter. The following is the account of them given in the report.

Preparation and Analysis of Solutions.

The solution of thiosulphate employed was obtained by double decomposition; molecular equivalents of barium thiosulphate ($BaS_2O_3.H_2O$; mol. wt. 267) and ferrous sulphate ($FeSO_4.7H_2O$; mol. wt. 278) being allowed to react upon one another in aqueous solution in a stoppered flask. The reaction was hastened by an inversion of the flask from time to time, accompanied by gentle agitation of the contents, so as to maintain the slightly soluble barium thiosulphate in suspension, and thus promote its action upon the ferrous salt. Prepared in this way, a solution was obtained in which the iron present as thiosulphate reached a maximum figure after an hour to an hour-and-a-half's agitation. But, contrary to expectation, this never exceeded 95 to 96 per cent. of the total iron taken as ferrous sulphate, even when the barium salt was used in distinct excess of that required by theory to complete the decomposition.

Complete separation of the barium sulphate, resulting from the reaction, by subsidence proved a very lengthy operation; but an approximately clear solution was obtained by allowing the flask to stand for half an hour before removal of the supernatant liquor for analysis, &c.

Exact determination of the sulphur present as thiosulphate and sulphate proved to be by no means easy, owing to the very small amount of sulphate present and to co-existence of iron and sulphur in the same solution. But an approximate analysis was effected as follows:—

(1) Sulphur as thiosulphate by titration with $\frac{N}{10}$ iodine.

(2) Total soluble iron by titration with $\frac{N}{10}$ bichromate, after oxidation with excess of bromine, followed by exact reduction with stannous chloride.

(3) Iron as sulphate, taken as the difference between the total iron (2) and the iron equivalent of thiosulphate (1).

These methods were in use for the preparation and analysis of the ferrous thiosulphate solution throughout the experiments; the same amounts of ferrous sulphate and barium thiosulphate being allowed to react upon one another in presence of the same volume of water for the same length of time—a fresh solution being prepared for each day's work.

The thiosulphate solution was found to vary very little in composition, and the following analysis (per 100 c.c. of settled liquor) may be taken as typical of the results obtained:—

Total iron in solution	= 0·5512
Iron equivalent of sulphur as thiosulphate . . .	= 0 5344
Difference, assumed to be iron as sulphate .	= 0·0168
Total iron taken as ferrous sulphate	= 0·5600
	Per Cent.
Total iron in solution as thiosulphate	95·4
Total iron in solution as sulphate	3 0
Difference, being iron insoluble	1 6

The mean of all the analyses made gives the figure 0·5345 for the amount of iron present as thiosulphate, and 0·0186 for that present as sulphate. The latter figure varied so little that it was adopted in all the calculations as a constant, both in the liquor taken and in the finished products—a procedure justified by confirmatory estimation of the total sulphur by precipitation as barium sulphate, after bromide oxidation.

Such a solution of thiosulphate was colourless. Addition of barium chloride caused the slight cloudiness to increase somewhat. In the absence of air, the solution appeared to be stable, even when heated to 70° C. Thus:

Sulphur as thiosulphate taken . . .	= 0·3068
Sulphur as thiosulphate after heating 1½ hours in stoppered flask . . .	= 0·3026

The solution of sulphuretted hydrogen employed was on each occasion prepared just before use by passing the gas into recently boiled water until the desired strength was attained.

Method of Research.

This followed very closely the lines of the work done last year. Suitable volumes of thiosulphate and sulphuretted hydrogen were allowed to react upon one another in stoppered flasks kept at a constant temperature by means of a water-bath. The level of liquor was, in each experiment, arranged to stand in the narrow neck of the flask, so as to reduce to a minimum surface contact with residual air. At the conclusion of the experiment, the flask was set aside to cool; the cold contents being thoroughly mixed by gentle agitation, and the precipitate allowed to settle before removal of the stopper for analysis. The following is an analysis of the contents:—

(A) *Clear Solution.*—(1) Sulphur as thiosulphate, sulphite, and sulphide,—by Richardson and Aykroyd's joint iodine and acidimetric method. (2) Total iron, by $\frac{N}{10}$ bichromate, after oxidation with excess of bromide and reduction by stannous chloride. (3) Iron as sulphate, calculated from volume of ferrous thiosulphate taken, using the constant (0·0186 per 100 c.c.) determined in the way already described.

(B) *Insoluble.*—The black precipitate in the flask was well washed by decantation with water, dilute hydrochloric acid, and alcohol successively before analysis: (1) Sulphur, by extraction with carbon bisulphide. (2) Iron, by calculation; *(a)* Equals difference between total iron taken and total iron present in solution at the end of the experiment. *(b)* Equals iron equivalent of difference between total sulphur taken and total sulphur in solution in various forms at the end of the experiment.

Consideration of the possible reactions that might be expected to take place when thiosulphate of iron and sulphuretted hydrogen react upon one another in aqueous solution led to the adoption of the working hypothesis represented by the following equations, to serve as a guide in determining the relative proportion of sulphur as thiosulphate and sulphide to take in the reacting mixture, and in directing the analysis of the finished product:—

(1) $FeS_2O_3 + H_2S = FeS + H_2S_2O_3$
(2) $H_2S_2O_3 = H_2SO_3 + S$

[See Experiment A in table, p. 626.]

The finished liquor, however, was found to be practically neutral, and to contain only traces of sulphite. It was evident, therefore, that if sulphurous acid were produced by secondary reactions, it must subsequently be decomposed, either by excess of sulphuretted hydrogen or by some other body.

The hypothesis named above was therefore extended to include the following secondary reaction—

(3) $H_2SO_3 + 2H_2S = 3H_2O + 3S$;

and to enable the complete reaction to be represented by the equation—

(4) $FeS_2O_3 + 3H_2S = FeS + 4S + 3H_2O$.

Examination of the black precipitate obtained as one of the products of decomposition, however, at once showed that the hypothesis was untenable; for the precipitate, so far from consisting of a mixture of ferrous sulphide (FeS) and sulphur, was found to be completely insoluble in dilute hydrochloric acid, and yielded no trace of sulphuretted hydrogen when treated with an excess of that reagent.

To summarize the objections to the above hypothesis. In the first place, the amount of free sulphur obtained when the reaction had spent itself approximated in every case to 60 per cent. of the total sulphur as thiosulphate and sulphide decomposed. Equation (4) requires 80 per cent. Secondly, sulphide of iron (FeS) was entirely absent from the products of decomposition. Equation (4) requires the whole of the iron and 20 per cent. of the total

TABLE *showing Results of Experiments.*

	Taken.				In Finished Liquor.			Amounts Converted. Grammes.		(i.) Amounts Converted. (ii.) Distribution of Sulphur and Iron in Products of Conversion.			Remarks.
		Iron.				Iron.				Per Cent. of Total Converted.			
	Sulphur.	Calculated from Sulphur.	Found.	Molecular Relation between Ferrous Thiosulphate and Sulphuretted Hydrogen.	Sulphur.	Calculated from Sulphur.	Found.	Sulphur.	Iron, calculated from Sulphur.	Sulphur.	Iron. Calculated from Sulphur.	Iron. Found.	
	(*a*)	(*b*)	(*c*)	(*d*)	(*e*)	(*f*)	(*g*)	(*a-e*)	(*h*)	(*i*)	(*j*)	(*k*)	
A.	Grms.	Grms.	Grms.		Grms.	Grms.	Grms.						*Liquor.* 1.—*Volume* in Expts. A and B = 500 c.c. C = 590 c.c. 2.—*Temperature.* A, B, C = 60° to 70°. 3.—*Time of Reaction.* A and B, 1½ hours hot, 20 hours cold; C, 6 hours hot, about 20 hours cold.
Thiosulphate.	1·217	1·065	..	$FeS_2O_3 : H_2S$	0·834	0·730		0·383	0·335	38·2	100·0		
Sulph. hyd. .	0·619	..	..	..	..	..		0·619	..	(i.) 61·8	..		
Total . .	1·836	1·065	1·058	..			0·733	1·002	0·335	100·0	100·0		
Sulphur . .					0·611	..				61·0	..		
Sulphite . .					0·006	0·010				(ii.) 0·6	3·0		
Other forms (by diff.)					0·385	0·325	0·325			38·4	97·0	97·0	
Total . .					1·836	1·065	1·058			100·0	100·0	..	
B.													B.—Determination of relation of iron to sulphur in black residue left after extraction of sulphur by carbon bisulphide— Iron. Sulphur. (*a*) 46·7 53·3 (*b*) 47·1 52·9 Calculated for FeS_2 (*c*) 46·7 53·3
Thiosulphate.	0·764	0·668	..	$FeS_2O_3 : 2H_2S$	0·282	0·247		0·482	0·421	38·7	100·0		
Sulph. hyd. .	0 765	..	..	..	..	..		0·765	..	(i.) 61·3	..		
Total . .	1·529	0·668	0·666	..			0·256	1·247	0 421	100·0	100·0		
Sulphur . .					0·741	..				59·4			
Sulphite . .					0·005	0·009				(ii.) 0·4	2·1		
Other forms (by diff.)					0·501	0·412	0·410			40·2	97·9	97·4	
Total . .					1·529	0·668	0·666			100·0	100·0	..	
C.													C.—Approx. wt. of black residue, after extraction of sulphur—dried *in vacuo* . . = 1·340 Sum of sulphur (*e*) 0·792 and iron (*g*) 0·614 = 1·406 Expt. C exactly confirms similar experiment in which the time of heating was less. Conditions of space require exclusion of the latter.
Thiosulphate.	0·763	0·668	..	$FeS_2O_3 : 3H_2S$	0·068	0·060		0·695	0·608	(i.) 38·9	100·0		
Sulph. hyd. .	1·160	..	..	..	0·068	..		1·092	..	61·1	..		
Total . .	1·923	0·668	0·673	..			0·059	1·787	0·608	100·0	100·0		
Sulphur . .					0·995	..				55·7	..		
Sulphite . .					traces	..				(ii.) traces	traces		
Other forms (by diff.)					0·792	0·608	0·614			44·3	100·0	101·0	
Total . .					1·923	0·668	0·673			100·0	100·0	..	

CONCLUSIONS.

Ferrous thiosulphate and sulphuretted hydrogen, when heated together in solution, react to orm iron bisulphide, water, and ree sulphur, according to the equation $FeS_2O_3 + 3H_2S = FeS_2 + 3H_2O + 3S$, which indicates that of the total sulphur taking part in the reaction 40 per cent. is obtained in the product, in combination with the whole of the iron, as iron bisulphide (FeS_2), and 60 per cent. as free sulphur (3S).

sulphur decomposed to be present in that form. Thirdly, the insoluble product behaved qualitatively like a mixture of free sulphur and iron bisulphide (FeS_2)—a result fully confirmed by quantitative analysis; the proportion of iron and sulphur present in the residue left after extraction of the free sulphur by carbon bisulphide being exactly that required by theory for the compound FeS_2.

One was therefore justified in rejecting the first hypothesis in favour of one represented by the following equation:—

$$FeS_2O_3 + 3H_2S = FeS_2 + 3H_2O + 3S,$$

which affords a full and adequate explanation, quantitative as well as qualitative, of the reactions that take place.

It is interesting to note that the reaction is not limited by the proportion of thiosulphate and sulphide present, but proceeds on the same lines, though at different rates, whether one, two, or three molecules of sulphuretted hydrogen are present to one molecule of FeS_2O_3.

In explanation of the above table, in which the various results obtained are fully set out—

(*a*) shows the distribution of sulphur in the reacting mixture, and the total weight of sulphur taken.*

(*b*) gives the iron equivalent of the sulphur as thiosulphate taken.

(*c*) gives the total amount of iron found in solution.*

(*d*) shows the molecular relation between the thiosulphate and sulphuretted hydrogen in the reacting mixture. Thus—
FeS_2O_3 contains 2S } 2S : S :: 1·217 : 0·619, and
H_2S „ S } so on.

(*e*) shows the distribution of sulphur in the finished liquor.*

(*f*) gives the calculated iron equivalent of the sulphur present in the various forms indicated by (*e*).

(*g*) gives the amount of iron present—(i.) in solution, by direct determination, $\frac{N}{10}$ bichromate; and (ii.) in insoluble form (by difference), substracting iron in solution (*g*) from total iron (*c*).

(*a-e*) gives the actual amounts of sulphur as thiosulphate and sulphuretted hydrogen decomposed, obtained by subtracting sulphur in those forms found in finished liquor (*e*) from the respective amounts in the same forms in the reacting mixture (*a*).

(*h*) gives the calculated iron equivalent of the sulphur as thiosulphate taking part in the reaction.

(*i*) gives (i.) the amount of sulphur as thiosulphate and sulphuretted hydrogen decomposed, per cent. of total sulphur decomposed; and (ii.) the distribution of sulphur as free sulphur, sulphite, and bisulphide present in the finished liquor, per cent. of the total sulphur decomposed—columns (*e*) and (*a-e*).

(*j*) gives similar figures for the iron—columns (*f*) and (*h*).

(*k*) gives the amount of iron in the insoluble form, per cent. of the total iron decomposed—columns (*g*) and (*h*).

* Sulphur and iron as sulphate excluded for the sake of simplicity.

REGISTER OF PATENTS.

Pressure System for Incandescent Gas Lighting.—Scott-Snell, C., of Victoria Street, S.W. No. 17,507; Aug. 31, 1901.

This invention consists in "a combination of low-pressure and high-pressure mixing in the burners and mixing contrivances, intended to supply the incandescent mantle with high-temperature flame."

In most existing systems of incandescent gas lighting under intensified pressure (the patentee remarks), gas is raised from the ordinary pressure of the mains—about 2 inches—to as much as 8 inches or over. In some instances, the pressure is raised by a power-operated pump; in other cases it is automatically raised in the lamp itself by an action resembling that of a hot-air engine displacer. Gas, at the ordinary pressure of 2 inches, draws into a bunsen type of burner about 4 cubic feet of air for every cubic foot of gas passing through the nozzle—that is, with gas at normal pressure, 15 cubic feet of gas will draw into the burner about 60 cubic feet of air. This amount of air is too small to enable the highest temperature to be obtained by the resulting flame. With gas at 8 inches pressure, each cubic foot will draw in 5 cubic feet of air. This proportion gives about the maximum

flame temperature for incandescent gas lighting when using London gas; and the object of the pressure-intensifying systems in use is (the inventor points out) to supply the mantle with a flame-producing mixture of this composition—that is, 15 cubic feet of gas at normal pressure requires 15 cubic feet of air more than it is able to draw in at that pressure.

He proposes therefore to provide a bunsen or other type burner, in which the whole supply of gas passes into the mixing-tube through a jet or jets at the ordinary pressure of the mains. This gas draws in as much air as is possible—say, 4 cubic feet of air for 1 cubic foot of gas. The additional air required is provided by compressing a small portion of the added air needed, and causing this compressed air to flow into the burner—drawing with it a further supply of air from the external atmosphere. The invention thus consists in part in "adding to a burner operating at low pressure sufficient air to produce a mixture of the maximum heating power." Taking a consumption of 15 feet per hour of gas as the basis, he provides for the addition of 15 feet of air to make up the best mixture. To do this, it is only necessary to compress about 3 cubic feet of air to 8 inches pressure. He discharges these 3 feet of compressed air into the burner by suitable jets so arranged as to increase the flow of air from the atmosphere into the burner to the required extent. To provide an effective mixture, he thus has only 3 feet of air to compress, instead of 15 feet of gas. In this way, he claims to "greatly increase the power of the existing compressing contrivances so far as incandescent gas lighting is concerned." An ordinary Scott-Snell self-intensifying gas-lamp of certain dimensions is capable of giving about five times the light which could be done by compressing the gas instead of compressing the additional supply of air.

In carrying the invention into effect, the patentee preferably provides a burner containing a central gas-nozzle sufficient to pass the whole supply of gas required for the lamp at the ordinary pressure of the mains. In the burner mixing-tube, there are suitable holes or passages for the admission of air to mix with the gas leaving the nozzle. Also within the mixing-tube there are air-nozzles fed by compressed air supplied to an annulus—the nozzles drawing in a further quantity of air from the atmosphere.

An illustration is given of one way in which the invention can be carried into effect, as described above. In a modification referred to incidentally, it is proposed to supply the additional air to the burner-tube at a separate point, by means of a separate pressure-operating injector, to add the additional air required to produce the best mixture. But, in every case, the "essential feature of the invention is that the combined energy of the gas and air jets is employed so as to enable the quantity of air to be supplied under pressure to be reduced to a minimum."

Cooling the Valves of Gas-Engines.—Bellamy, A. R., of Stockport. No. 19,012; Sept. 24, 1901.

This invention of means for keeping a gas-engine exhaust valve cool, and maintaining a constant circulation of water through it, is effected by causing the exhaust valve spindle, or other spindle or stem, to act as a ram to draw and force the cooling liquid through the valve. By thus utilizing the valve-stem, positive circulation of water is obtained under pressure through the valve, and the necessity of utilizing water under pressure from any other source is dispensed with.

Under one arrangement, the tubular stem or spindle of the valve is mounted to slide in a cylinder suitably supported. The cylinder is formed with two chambers, into one of which the water is sucked or drawn on the upward stroke of the valve-spindle. The chamber is provided with a back-pressure valve. The second chamber is the exhaust chamber, the reciprocating valve-spindle being in communication with it by means of ports cut into the annular wall of the spindle. Within the hollow spindle of the valve a tube is mounted; communication existing between the first chamber and the interior of this tube through a back-pressure valve arranged in the foot of the spindle.

The action of the apparatus is as follows: On the upward movement of the valve-spindle—due to the action of the exhaust valve lever or other actuating part—water finds its way, or is drawn, into the lower chamber past the back-pressure valve. With the descent of the spindle, this water is forced up the central tube to the head of the valve, and thence down the space between the inner tube and the valve-spindle, from which it escapes through the ports into the exhaust-chamber. Thus, as the valve-spindle reciprocates, a positive circulation of water through the valve is automatically maintained.

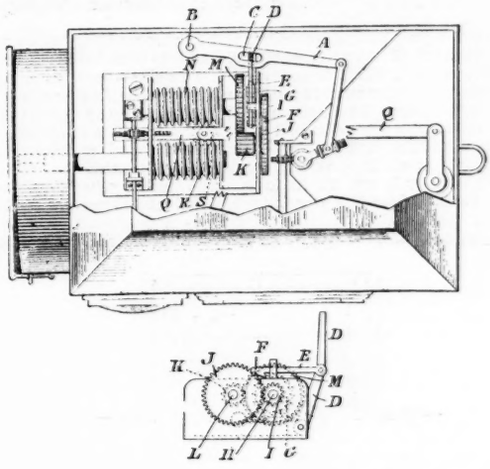
The water drawn by the valve-spindle may be taken from the supply passing to the ordinary water-jacket; and the water forced from the exhaust-chamber may pass back again to the water-jacket, and so serve to accelerate the circulation of water therein.

Coin-Freed Mechanism.—Glover, R. T. & J. G., of Clerkenwell. No. 19,855; Oct. 4, 1901.

This invention is especially applicable to the mechanism described in patents Nos. 22,830 and 25,272 of 1894, although it can be applied to other mechanism in which rotary motion is converted into reciprocating motion; the reciprocation motion being effected in one direction by one rotating appliance, and in the other by another rotating appliance.

A plan of the meter mechanism is shown, and a side view also applied to the mechanism described in patent No. 22,830 of 1894.

To the arm A of the rod B is fixed a slotted plate, or a slot C is made in the arm, this engaging a pivoted rod D carrying a pivoted arm E having at its free end a nose or pawl F for acting upon a ratchet-wheel G. This wheel carries on its axle H a toothed pinion I for gearing with one of two toothed pinions J K, secured to another axle L. The other toothed pinion K gears with a wheel M on the end of the link-operating worm N, so that the motion from the ratchet-wheel G can be transferred to the link-operating worm N—the proportion of movement to close the stop-valve being according to the ratio of the train of gear wheels I J K M used. The reverse movement of the link Q (to open the stop-valve) is effected by the other link-operating worm R; the pinion S in the link Q merely walking over the closing operating worm without imparting any movement to it. Thus it will be seen that the bellows movement actuates, through the usual rod B and arm

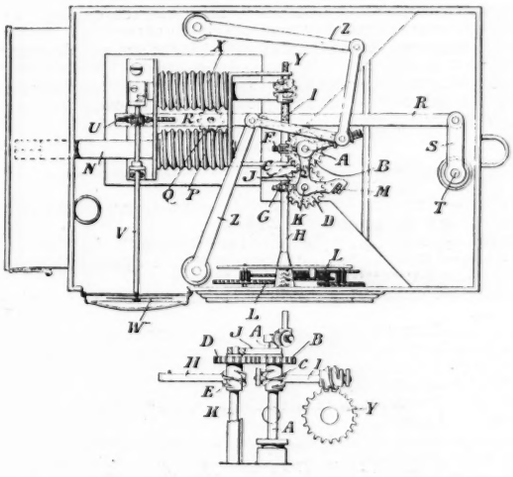


A, the rod D; and this in turn (during one movement of the arm) places the pawl F over the ratchet-wheel G ready to actuate the ratchet and other gear on the reverse movement of the arm A. The operations continue until the link Q is moved sufficient to turn off the supply of gas, when the action of the bellows, and consequently the gear-operating movement, is stopped.

Coin-Freed Gas-Meters.—Glover, R. T. & J. G., of Clerkenwell. No. 20,014; Oct. 7, 1901.

This invention relates to means whereby the coin-freed operating mechanism and the index mechanism of the meter are driven separately, instead of from the index-spindle as is usual.

A plan and side elevation of the mechanism are given—showing the crank-spindle A with a pinion B in addition to the usual worm gear C. In close proximity to it is pivoted a combined pinion D and worm gear E; the pinion D gearing with the pinion B on the crank-spindle.



The worm on the crank-spindle gears with a pinion F connecting the coin-freed mechanism; while the other worm E gears with the usual pinion G on the index-operating spindle H, so that the coin-freed operating mechanism and the index mechanism are operated through separate shafts H I, instead of from the one shaft as before—the shaft I carrying a worm gearing with a pinion Y on the worm X. A cranked arm J is fitted over the spindle A carrying the worm for gearing with the coin-freed mechanism, and over the spindle K carrying the gear for operating the index mechanism L; and the cranked arm carries the usual pawl M for preventing back motion of the bellows mechanism.

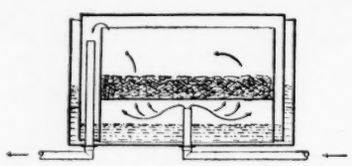
In operation, and after a coin has been inserted, the rod N is turned; and this, by its worm P, operates the pinion Q attached to the rod R, and moves it to actuate the crank S. This opens the valve upon the spindle T; the rack U on the rod R at the same time operating the spindle V for indicating, by its pointer W, on the dial the number of feet of gas to be supplied for the coin inserted. During this movement, the pinion Q is walking over the worm X, which is in gear with the worm C by the pinion Y. The mechanism is now free to be operated by the supply of gas for delivery to the burner; and as the spindle A is rotated by the arms Z (due to the action of the bellows), the worm C will, by the gearing, operate the worm X, and this will move the pinion Q, and cause it to move the rod R to close the valve on the spindle T, and also operate the pointer W. At the same time the pinion B, by gearing with the pinion D, will cause the worm E to operate, by the pinion G, the index mechanism L, and record the gas consumed—the pinion Q during the return movement of the rod R walking over the worm P without imparting movement to it.

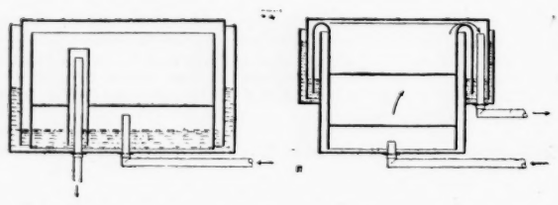
Purifying Gases.—Doman, W., of Amblecote, and Bullas, S. W., of Cradley Heath. No. 22,648; Nov. 9, 1901.

The illustrations show three means proposed by the patentees of forming the seal between the inner and outer purifying vessels by means of a liquid, "whereby the manipulation or charging of the apparatus is simplified."

According to the first way shown, it is proposed to provide an outer vessel or tank of any suitable shape, and into it an inner vessel or container is placed, which is somewhat less in size—thus leaving a space all round to accommodate a lid or cover, similar in shape but placed inverted therein. The bottom of the tank forms the top of the cover, which takes the place of a bell in a gas-meter. The container is open top and bottom, and provided with a perforated or wire mesh diaphragm upon which the purifying material is placed.

The purifier is worked as follows: Water or other liquid or semi-solid is filled into the empty tank sufficient in quantity to form an effectual seal. The purifying material is now spread out on the diaphragm, and the cover is placed over the container. The gas enters





by the inlet-pipe, which projects through the bottom of the tank and terminates underneath the diaphragm through which (and the purifier placed thereon) the gas diffuses, and, deprived of its impurities, passes away by the outlet-pipe.

The second arrangement of purifier is similar, except that the outlet-pipe in this case passes up through the tank bottom, through the purifier diaphragm, and terminates in the upper part of the container. In this case, a projecting sleeve is placed round the outlet-pipe to prevent any impure material or gas from passing down it.

The working of the third arrangement is the same again, except that a pocket or jacket is provided around the outside of the upper portion of the tank, providing the seal. Two diaphragms are shown in this case, although any number might be used (the patentees remark) in any of the arrangements.

APPLICATIONS FOR LETTERS PATENT.

17,889.—Thubron, D., and The Leading Light Syndicate, Ltd., "Acetylene gas-generators." Aug. 14.

17,936.—Bixter, J., "Coin-freed mechanism." Aug. 15.

17,976.—Tcherniac, J., "Manufacture of cyanides from sulphocyanides, and apparatus therefor." Aug. 15.

18,035.—Dempster, J., "Lutes for the covers of gas-purifiers." Aug. 16.

18,043.—Ericson, F. G., and the Aktiebolaget Svenska Motor Och Naffabriken, "Cam-discs for operating the exhaust-valve in four-stroke internal combustion engines." Aug. 16.

18,045.—Bernhard, C., "Gas-cooking apparatus." Aug. 16.

18,051.—Podmore, A. E., and Thomas, J., "Incandescent gas-lamp lighter." Aug. 16.

18,065.—Read, F. J., "Retorts, tubes, and the like." Aug. 16.

18,121.—Thomson, R. W., "Gas radiators." Aug. 18.

18,130.—Raynaud, E. & F., "Carburetting air or gas." Aug. 18.

18,131.—Marshall, F. D., "Conveying incandescent coke from retorts." Aug. 18.

18,133.—Boult, A. J., "Gas-lamps." A communication from the New Process Lighting Company." Aug. 18.

18,163.—Pairier, R., "Internal combustion engines." Aug. 18.

18,182.—Keith, J. & G., "Anti-vibrating supports for incandescent burners." Aug. 19.

18,200.—Hucks, W. & W., jr., "Air and gas engines." Aug. 19.

18,206.—Proctor, J. W., "Feeding of gas-producers." Aug. 19.

18,222.—Sugg, W. T., "Bodies for use in incandescent gas lighting." Aug. 19.

18,284.—Jeffery, W. H., "Pendant supports for incandescent gas-burners." Aug. 20.

18,286.—Jeffery, F. W., "Supports for burners used in incandescent gas lighting." Aug. 20.

18,295.—Potter, W. G., "Bunsen burners." Aug. 20.

18,310.—Tresenreuter, G., "Mixing air and gas." Aug. 20.

18,333.—Sugg, W. T., "Lanterns for public incandescent gas lighting." Aug. 20.

18,363.—Meinhardt, R., "Acetylene lamp." Aug. 21.

18,396.—Moeller, J., "Automatic generation of acetylene gas." Aug. 21.

18,401.—Petitpierre, J., "Acetylene burners." Aug. 21.

18,432.—Ham, F. G. S., "Valve or meter boxes." Aug. 21.

18,529.—Reuis, M., "Gas-chandeliers." Aug. 23.

18,590.—La Société Houdaille et Triquet, "Burner for incandescent gas lighting." Aug. 23.

CORRESPONDENCE.

[We are not responsible for opinions expressed by correspondents.]

Illegal Use of Discs to Work Meters.

Sir,—In your "Legal Intelligence" of the 26th inst., a case is reported in which the Bath Gas Company summoned one of their slot meter consumers for "fraudulently abstracting, consuming, and using gas" to the value of 2d. by means of a medal and two bone discs. With 130,000 slot meter consumers, perhaps our custom in such cases may be of interest to you and your readers.

It has been quite a common occurrence to find foreign coins and metal tickets in the money-boxes of our meters; and on the attention of the consumer being drawn thereto, the requisite copper coinage has been forthcoming. In one particular district where there is a very large and flourishing Co-Operative Society, I should not be exaggerating when I say that, in clearing the boxes, our collectors have found thousands of their metal tickets. But we have never considered these consumers were fraudulent, or intended to be; and we have found no difficulty in obtaining the money.

I may also mention that florins are frequently discovered in the boxes; their presence being often unsuspected by the consumer. Of course, these are returned in exchange for the necessary pennies.

It may well be that in the Bath Company's case there were other facts which we are not aware of, and that they felt bound to prosecute. To summon a consumer, however, merely because of the presence of discs, which he is willing to redeem on demand, appears undesirable, and must necessarily cause irritation among slot meter consumers. Surely the fact of placing the two discs and medal in the box (knowing that they will be found by the collector) negatives any suggestion of fraud. Would it not be better, unless there is deliberate fraud or theft, to avoid litigation?

I have troubled you with this letter in the hope that some other course short of legal proceedings may be adopted by gas companies generally, and that the action of the Bath Gas Company will rarely be followed, and then only in extreme cases.

South Metropolitan Gas Company, Frank Bush, Secretary.
Aug. 29, 1902.

LEGAL INTELLIGENCE.

Imprisonment for Stealing Gas.

At the Stoke-upon-Trent Borough Court, last Thursday, Walter Chatwin, a metal smith, pleaded guilty to laying a pipe communicating with another pipe conveying gas to his workshop, and, further, to having stolen a quantity of gas, the property of the Stoke Corporation. The prisoner had in his workshop a prepayment meter, and on the 20th ult. it was found that the service-pipe from the main had been severed, and that prisoner had a piece of india-rubber tube which fitted upon the service-pipe, and had a burner at the other end. The allegation was that by means of this tube prisoner had taken a quantity of gas before it entered the meter, and used it in connection with the ordinary jets, a cooking apparatus, a blow-pipe, and for showing devices for Coronation illuminations. No gas, it was stated, had passed through the meter since the 7th of May. Mr. A. E. Bell, who appeared for the prisoner, said a month ago the supply-pipe in the workship was accidentally broken, and he foolishly cut it off instead of repairing it or reporting the matter at the gas-works. After this he made use of gas on two occasions, but only for a short period. The Bench characterized the action as serious. For the first offence accused was fined 40s., and 13s. 6d. costs, or a month, and for the second he was sent to prison for a month with hard labour—the two terms to run concurrently.

Abstracting Money from Gas-Meters.

At the Birkenhead Police Court, last Tuesday, a respectable-looking man named William Christopher Barrand, of Abercynon, a collector lately in the service of the Birkenhead Corporation, was charged with having stolen 3s. 11d., the money of the Corporation, on or about the 7th of March last; also with embezzling the sums of 12s. 2d. and 5s. 9d., both in or about that month. Mr. Spencer stated that the prisoner had been employed by the Corporation collecting the pence from prepayment gas-meters in the Tranmere district; and it was his duty to pay in at the office each evening the money he received on his rounds. On the 7th of March he called at the house of a Mrs. Williams, and took from the money-box the sum of 3s. 11d., but did not give any receipt. There was no entry in his book of having received this amount, and he had not paid it in. The other two charges were precisely similar. Prisoner was arrested by the Glamorganshire police at Abercynon, and handed over to the Birkenhead police, and when charged he admitted having taken the money, but said he did it through stress of circumstances, sickness in his family, and the death of two of his children. He fully intended to replace the money. In reply to the Bench, Mr. Spencer said there were quite sixty cases altogether, and only three had been brought against the prisoner. The total amount of the defalcations was upwards of £40. Prisoner pleaded guilty, and threw himself on the mercy of the Court. He said he had had a good deal of sickness in his family, which had been a great expense. He was formerly manager of a branch shop for a sewing-machine company, where £30 a week passed through his hands, and with commission he was earning 19s. a week. He left this situation, and obtained the one under the Corporation. The Bench reminded him that he had already served three months' imprisonment for another offence. They would make some allowance for his domestic trouble, and he would have to go to prison for 14 days on each charge—six weeks in all.

MISCELLANEOUS NEWS.

MR. CHARLES HUNT'S RETIREMENT FROM BIRMINGHAM.

Officers' and Workmen's Farewell.

There was a very large gathering of the officers, staff, and workmen of the Windsor Street and Adderley Street Gas-Works, Birmingham, at the former station, on Saturday last, on the occasion of the leave-taking of the Engineer—Mr. Charles Hunt. A spacious marquee had been specially hired by the men for the occasion. The chair was occupied by Mr. THOMAS BRADBEAR, who has been foreman of the Meter Department at these works since Jan. 1, 1876.

The CHAIRMAN, in opening the proceedings, drew attention to the fact that they had had a great many meetings on the works of all descriptions, but never one on so important an occasion as at present; and they now began to realize what the loss of their Engineer, Mr. Hunt, would mean to them. The presentations that they were about to offer him were a token of their great respect and admiration for him as an employer and as a gentleman. This occasion was one of deep regret combined with pleasure—regret at parting with one with whom they had been so intimately connected for a great number of years; and pleasure to see the splendid condition he was in to continue his work. He thought all present would agree with him that there was plenty of work still left in Mr. Hunt; and in years to come when he reflected upon this scene, it would without doubt remind him of all that they felt towards him, and the good fellowship of the staff at the two works.

Mr. W. S. GOAD (Chief Clerk and Cashier) had much pleasure in endorsing the remarks of the Chairman. At the same time he shared with him the wholesome regret which he had expressed that they were now face to face with the fact that they must that day part company with their highly respected chief. Personally, his term of association with Mr. Hunt had been of comparatively short duration. Nevertheless he was in a position to testify, not only for himself but for all the members of the staff, to the genuine esteem and admiration which they had always entertained for him. They had respected Mr. Hunt because they had discerned in him a gentleman of honour, whose dealings with them had been marked with a firm but even-handed justice, who had always given them his kindly advice and assistance in matters of doubt and difficulty, and who had always taken the liveliest interest in any movement connected with the works—whether social, philanthropic, or otherwise—which would tend to raise the standard or improve the status of those with whom he had been associated. And now that the process of time had brought them to the parting of the ways, it was his duty to convey to Mr. Hunt their high sense of appreciation of his kindly feeling towards them, and of his uniform consideration for their well-being. They were heartily sorry that he was leaving them; and in bidding him farewell, they wished him—and not forgetting Mrs. Hunt—long life and happiness.

Other speakers followed—among them being Mr. William Webb, who has been foreman at Barn Street stables since their erection by the old Birmingham Gas Company in 1873; Mr. Floyd, representing Adderley Street works, and also the Department Sick Allowance Society; and Messrs. Eli Pain and Henry Beecham, representing the Windsor Street works. The former is also Chairman of the Board of Managers Sick and Funeral Allowance Society. All the speakers testified their esteem for Mr. Hunt, in whom they had found a warm friend, and expressed great regret at his retirement.

The CHAIRMAN, on behalf of the staff, foremen, and workmen at Windsor Street and Adderley Street, asked Mr. Hunt to accept an address and silver rose bowl as a token of the great respect and admiration in which they held him. Although, he observed, the marketable value of the presentation might not be very great, the motive which prompted the idea was of the greatest value; and he hoped that, in years to come, he would be able to reflect upon this scene, and think of all that it meant, with feelings of grateful remembrance. They all wished him a continuance of his present good health, and hoped that he might be spared many years to continue his work.

The presentation consisted of an address very richly illuminated, and enclosed in a solid gilt frame. It reads as follows:—

> To CHAS. HUNT, Esq.
>
> Dear Sir,—We, the Officers, Clerical Staff, and Workmen, at the Windsor Street and Adderley Street Works of the City of Birmingham Gas Department, beg to offer you our good wishes on your retirement from the responsible office of Engineer, after a lengthy and honourable service of thirty years.
>
> It is difficult, after having enjoyed an unbroken connection of so long duration, to express adequately in words how deeply we feel the severance, especially when we remember your uniform kindness and courtesy, and the impartiality with which you have invariably discharged your numerous duties—a no light task with such a large number of men, and so many varying occupations under your charge.
>
> While we regret your departure from among us, we each and all desire to mark our appreciation and regard of your kindly feeling and good will, and respectfully ask your acceptance of the accompanying silver rose bowl as a small token of the friendly relations which have existed between its superior officer and all grades of the works staff.
>
> In conclusion, we respectfully tender to you our unfeigned desire that you may be blessed with a continuance of good health; and we heartily wish you God-speed and happiness throughout increasing years.
>
> We remain, Dear Sir,
> On behalf of the Subscribers,
> Sincerely Yours,
>
> | | | |
> |---|---|---|
> | T. F. ENNIS | W. BAFFIN | W. WEBB |
> | T. BRADBEAR | S. TURNER | W. BOWDLER |
> | W. S. GOAD | S. OUGHTON | E. ELKINGTON |
> | D. LAYTON | W. DYKE | J. FLOYD |
> | W. ALLEN | W. C. HAWTIN | C. OSBORNE. |
>
> *Birmingham, Aug.* 30, 1902.

The Address was accompanied by a magnificent silver rose bowl by Messrs. Elkington and Co., bearing the following inscription:—

> Presented to CHARLES HUNT, ESQ.,
> By the Officers, Staff, and Workmen of the Windsor Street and
> Adderley Street Works of the City of Birmingham Gas
> Department on the occasion of his Retirement
> from the Post of Engineer after
> 30 Years' Service.
>
> 30*th August*, 1902.

It also bears Mr. Hunt's monogram, and it was most appropriately filled with the choicest roses of the season, forming a most elegant bouquet.

Mr. HUNT, in acknowledging the presentation, said that he would be less than human if he did not feel deeply touched by their too generous words, their too kindly uttered sentiments, and by this magnificent pledge of the sincerity of them; and if he was unable to say all that he could find it in his heart to say, he was sure they would excuse him upon such an occasion as this. He need not tell them how very deeply he regretted the severance which had come at last, and which he regretted none the less keenly because it was his own choice. But a time such as this must come to everyone; and he had felt it incumbent upon him to take the step. Had it simply rested with the works and those engaged upon them with whom he had been so long and so closely connected, he would have been contented, and indeed happy, to have lived and died among them; but he felt, however keenly he might regret it, that the time for severance had come. He wished to take this opportunity of acknowledging the great assistance he had at all times received from all who had been engaged under him at both the works, from the highest downwards. He remembered, almost as well as though it had been yesterday, the first time that he turned the corner of Lord Street, and came in full view of the works as they then were, to take up the somewhat difficult task that had been entrusted to him; and he was not ashamed to confess that, when at that moment he realized what was likely to be before him, he did feel a sinking of the heart. When, however, he entered the works, he soon found that he had come among friends who were ready and willing to assist him. His courage returned; and from that day to this, he had never felt despondent as to the results of anything in connection with the works. Many of them had grown in years with him, and had known the works as they existed formerly, and could realize the great change that had taken place. There were still some twenty or thirty of those who were engaged at the works when he took charge of them in 1872, among them being their respected friend Mr. Eli Pain. He felt that he had been singularly fortunate in those who had been selected to assist him in the work; for he could scarcely remember any case in which removal had been necessitated by dereliction of duty. There had, of course, been a great many changes—in fact, of the original staff scarcely one remained; but these changes had for the most part either been brought about by circumstances to which all humanity is subject, or by promotion to higher and more responsible duties. Where all had so well performed their duty, it might be thought invidious in him to mention names; but they would probably excuse him if he did refer to some who were with them that day. The first in point of seniority was Mr. David Layton, who followed him from the Nine Elms works, during the winter of 1872-3, and had been one of his most trusted advisors ever since. The next was Mr. W. Webb, who was appointed on his recommendation to the charge of the stables at Barn Street, which he (Mr. Hunt) erected for the old Birmingham Gas Company in 1873. The third was their respected Chairman that day, Mr. Bradbear, who came to the works a little later, and who had earned the respect and esteem of all who knew him. His time of service was now fast drawing to a close; and he wished him the full enjoyment of the rest he had so fairly earned. These and others had greatly lightened his task by their valuable assistance, which he took pleasure in acknowledging, and only hoped that his successor (whoever he might be) would be as fortunate in this respect as he had been. He need not say how very highly he valued the address, and the present which accompanied it. Not for their intrinsic worth, although that was very great, but more and chiefly as a token of the kindly feeling which had prompted them, and as a reminder of the friendly relations which had always subsisted between them. He should treasure them as being one of his most valued possessions, and hoped they would be handed down to his children's children. He thanked the speakers also for their very kindly references to his wife, whose inspirations (to which he was greatly indebted) were always in sympathy with the welfare of those around her. His thoughts would often wander to Windsor Street, to those he was leaving there, and to the work in which they had all for so long a time a common interest. Above all, he would never forget that last scene of all. From the bottom of his heart, he thanked them, and would always wish for their happiness and well-being.

It may be mentioned that the Adderley Street Brass Band was in attendance, and to the tune of "Auld Lang Syne" the meeting ended.

THE ENGINEER'S FAREWELL MESSAGE.

The following message from the Engineer was posted at Windsor Street and (with the necessary changes) at Adderley Street:—

> TO THE STAFF AND EMPLOYEES AT THE WINDSOR STREET WORKS.
>
> The Engineer, on retiring from the position which he has occupied since 1872, desires to record his grateful appreciation of the willing and efficient co-operation of those who have served under his direction, his relations with whom, it is a great satisfaction to him to know, have always been most cordial and friendly. In now bidding them farewell, which he does with very great regret, his best wishes are for their continued happiness and well-being.
>
> *Aug.* 30, 1902. (Signed) CHAS. HUNT, Engineer.

BRISTOL GAS COMPANY.

The Half-Yearly Meeting of this Company was held last Thursday—Alderman J. W. S. Dix (the Chairman) presiding.

The Secretary (Mr. John Phillips) having read the notice convening the meeting, the Directors' report, with the accounts, some figures from which were given in the "Journal" a fortnight ago (p. 510), was presented.

The Chairman said it was his pleasure to move the adoption of the report. He might say that the Company, like the other gas-producing concerns, had passed through a time of some little difficulty, owing to the great increase in the price of coal. They were now enabled to earn their dividend, and their prospects were good; and if any alteration were likely to take place it would be a decrease, instead of an increase, in the price of gas. This, he thought, would be satisfactory, especially to the consumers. Their increase for the half year was very gratifying—more than 3 per cent.; and since then (in the current six months) the increase had been 8 per cent. So that there was no appearance of a diminution in the use of gas. In Bristol, as elsewhere on the introduction of electric light, there had been an augmentation in the consumption of gas for the seven years ending in 1897. The Company had an increase of 1800 purchasers, and for the 5¼ years up to that meeting, the growth in the number of consumers was 10,400. This was a satisfactory feature of the Company's business. Of course, they could not go on increasing to this extent without a corresponding expenditure. The Board were about to issue fresh capital to the extent of £15,000, and £7000 on debentures. The concern was not only on a sound basis, but it provided its shareholders with an investment unequalled in the city.

Mr. E. J. Swann seconded the motion, and it was carried.

Mr. R. D. Robjent moved, in accordance with notice, that the portrait of the Chairman be painted in oils and hung in the Board-room. He bore testimony to Alderman Dix's splendid services to the shareholders as Chairman during two or three very trying periods.

The Rev. W. L. Parry seconded the motion, and it was adopted, with one dissentient.

The dividend recommended having been declared, a vote of thanks to the Chairman and Directors concluded the proceedings.

BARNET DISTRICT GAS AND WATER COMPANY.

The Half-Yearly Meeting of this Company was held on Friday, at the Albion Tavern, Aldersgate Street—Mr. Charles Horseley, J.P., in the chair.

The Secretary (Mr. Ernest W. Drew, F.C.A.) having read the notice convening the meeting, the Directors' report and the accounts were taken as read.

The Chairman, in moving their adoption, said that both showed the Company to be in a very satisfactory position—in fact, some of the features of the working of the half year were very good indeed. In the first place, as this had been the most anxious part of their business in some former years, it was very gratifying to be able to report that, during the present summer, the water supply had held out extremely well; and, so far as he knew, there was no portion of their district in which there had been a shortage of water. The wells had yielded all that was required; and there had been sufficient rain to keep them properly filled. As the report stated, the London Water Bill, introduced by the Government, contained clauses that were, in the opinion of the Directors, adverse to the Company's interests. They therefore retained Counsel, and incurred an expenditure of about £900, in seeking to protect those interests. They were successful in Committee; but notices of amendments had been given, which he trusted would not be passed, in view of the injury they would occasion. Of course, the profit of the half year was adversely affected to the extent of this £900. In regard to the works, they were in very good order at the present time. They had now the benefit of the new reservoir, which had a capacity of 1¾ million gallons. The mains, too, had been extended, and in some places replaced by pipes of larger size. The duplicating of the engines at the East Barnet pumping-station had been completed; and trials were now being made before driving the adits. They had a good supply from this well; and they had a large area through which they could drive the adits. The Directors were also contemplating sinking a well in the near future at the far end of the district. They were in the midst of water there, and they were desirous of keeping it. While the water portion of the Company's business continued to increase, he regretted to say that the gas sold was slightly less, in consequence of some of the public lamps now being lighted by electricity. It was proposed to reduce the price of gas from 4s. to 3s. 10d. as from Dec. 31 next. It would be remembered that it was raised in consequence of the advance in the cost of coals; but, in view of the more favourable state of the coal market, the Directors felt they were justified in making the suggested reduction. Taking both the undertakings together, the net profit for the half year amounted to £8875, which was more than sufficient to pay the dividends recommended. These would absorb £7400; and there would be a surplus of £1475 to be carried to the net unappropriated balance. Entering in more detail into the working of the gas undertaking, he said the gas made in the half year amounted to 47,121,000 cubic feet; and the quantity sold was 43,688,200 cubic feet. The gas unaccounted for was equal to 6·14 per cent. The decrease in the gas sold was about 250,000 cubic feet, or 0·59 per cent. The quantity of coal carbonized was 4294 tons, which was a reduction of 78 tons, and was due to the fact that they had had to make less gas. The production of gas per ton of coal carbonized averaged 10,974 cubic feet, and the gas sold 10,174 cubic feet, which he regarded as remarkably good. The quantity of coke made was 4085 chaldrons. The yield of tar was equal to 12½ gallons per ton of coal; and the quantity of sulphate of ammonia produced was 51 tons. In connection with the water undertaking, the amount of coal used was 981 tons, as compared with 972 tons in the corresponding half of last year. The increase in the water receipts was £115; and to this they had to add a reduction in the expenditure amounting to £649, which gave them an increase of £764 on the water profits. The total profit on the gas and water works was £10,482; and, deducting the interest on loans and the income-tax, they had a net profit, as he had already said, of £8875, or an increase of £1215. Respecting the £1475 which it was proposed to carry forward, this would have enabled them to pay a greater dividend; but, looking to the fact that they would have to spend some more money on new works which would not be immediately productive, the Directors thought it prudent to keep this sum in hand.

Dr. J. W. L. Glaisher, F.R.S., seconded the motion.

Mr. R. Johnson asked whether it would not be wise for the Directors to soon confess that the well at Potter's Bar was a failure, and suggested that they should tell the proprietors how much money had been spent there. In the accounts to December, 1901, the capital expenditure on water-works during the half year was shown to be £8599; and in the past half year a further £17,114 had been spent. It was also shown in December last that the Directors had "overdrawn the constable" to the extent of £28,000, and now by £38,000. These were matters that, in his opinion, required very careful watching. At the meeting last February, the Board were empowered to raise additional water capital to the extent of £40,000, and given borrowing powers to the amount of £10,000, under the Company's Act of 1887. Up to the present this money had not been raised; and he should like to know when it was likely to be.

The Chairman, in reply, said the Directors had no hesitation in saying that they were disappointed with the Potter's Bar well; but they could not tell when they started to drive it that it would not yield abundantly. However, they were obtaining from it 250,000 gallons a day, and they had only put sufficient machinery down to deal with the yield. Before sinking the well, they were advised by a most eminent geologist. The East Barnet well had met their expectations; and they were now getting from it as much water as could be obtained until adits were driven. If the adits proved as good as the Directors hoped they would, then they would be able to sink another well, and connect the two. The Board did not consider it good policy to call up capital on which they had to pay a high rate of interest until they were absolutely compelled; but it would be necessary to raise a portion of the new capital early next year. The time was not far distant when they would have to go to Parliament again; but they would prefer to keep out of Parliament if possible until things were a little more settled there.

The motion was unanimously carried.

On the proposition of the Chairman, seconded by Mr. Alfred Lass, dividends were declared at the rates of 7 per cent. per annum on the "A" and "C" stocks, 6 per cent. on the "B" stock, and £4 18s. per cent. on the "D" capital gas and water stocks and shares.

The Chairman next proposed a resolution providing for the conversion or consolidation into "D" capital water stock of 2888 fully paid-up "D" water shares of £10 each, forming part of the additional capital authorized by the Company's Act of 1883.

Dr. Glaisher, who explained that this was merely a financial transaction for the convenience of everybody, seconded the proposition, which was unanimously agreed to.

On the motion of the Chairman, seconded by Mr. A. F. Phillips, a cordial vote of thanks was passed to the officers and staff for their devoted services.

Mr. T. H. Martin (the Engineer), Mr. Drew, and Mr. Wright (the Chief Cashier) having responded,

A similar compliment was paid to the Chairman and Directors, on the motion of Mr. Simon, seconded by Mr. Johnson.

The Chairman's acknowledgment concluded the proceedings.

ASCOT DISTRICT GAS COMPANY.

The Ordinary Half-Yearly Meeting of this Company was held on Monday last week, at the London Offices, No. 50, Cannon Street, E.C.—Mr. Robert Berridge in the chair.

The Secretary (Mr. W. A. Schultz, F.C.A.) having read the notice convening the meeting,

The Chairman, in moving the adoption of the report and accounts, said he thought the former was fairly satisfactory; and, in fact, the Directors had heard expressions of opinion from many shareholders to that effect. As the report stated, they had made a profit in the half year of close upon £1471. After providing for every charge against the six months' working, there remained a balance of £1997 to the credit of profit and loss account. Out of this, the Directors recommended the payment of a dividend at the rate of 5 per cent. per annum, and that the balance of £554 be carried forward. Since the last meeting, the new gasholder had been completed, and was working splendidly; and he must congratulate all concerned on the grand improvement it had brought about. A matter of some importance to the Company was that the Directors had made a provisional agreement with the London and South-Western Railway Company to take over the lighting of the stations at Ascot and Sunningdale. As the shareholders were aware, the Company already possessed the lighting of the stations at Bracknell and Bagshot; but for years past the Railway Company had been lighting the Ascot and Sunningdale stations. Now it was hoped, subject to the arrangement of a few technical matters, that the agreement would be completely carried out. If so, it would be a good thing for the Company. Together with the lighting of the stations, they would take over a few private consumers along a private road belonging to the Railway Company; and this, it was also hoped, would add considerably to the profits. Regarding the working generally, there were a few comparative details that he thought would interest the shareholders. In the first place, the gas made in the June half of 1901 was 15,080,000 cubic feet, and in the past half year 16,505,000 cubic feet,

which showed that satisfactory progress was being made. The gas made per ton of coal carbonized had risen from 10,695 cubic feet to 11,043 cubic feet. The gas sold in the corresponding half of 1901 was 12,726,000 cubic feet, and in the past six months 14,706,200 cubic feet—the averages per ton of coal carbonized being 9025 cubic feet and 9843 cubic feet respectively. The quantity of gas unaccounted for in the first half of 1901 was 2,130,700 cubic feet, or equal to 14 per cent. This, he was glad to say, had been reduced to 1,593,800 cubic feet, or 9·6 per cent., which was a considerable improvement. The quantity of coke sold in the June half of 1901 was 494 tons, and in the period under review 727 tons. The amount received per ton for coke, less expenses, averaged in the corresponding period of last year 27s. 4d., and in the past half year 13s. 7d. Of course, all gas companies in the country were subjected to this variation; but, at the same time, it was a disappointment to the Directors that they had not been able to realize the same price for coke as in the first half of last year. The number of ordinary gas consumers had increased from 473 to 547, which was very gratifying; and the prepayment consumers showed a gain of from 194 to 245. The number of stoves on hire had advanced from 276 to 346; and the public lamps now numbered 128. As the shareholders were aware, the Company were lighting both Bagshot and Bracknell; but they had very few public lamps in Ascot. The Directors were in hopes of getting many more there by-and-bye; but at the moment in this respect they were practically at a standstill.

Mr. F. R. SMITH, in seconding the motion, remarked that the balance-sheet was a very satisfactory one—satisfactory from the Directors' point of view, inasmuch as the Company were taking over the lighting of two railway stations, and some additional private consumers; and, from the Engineer's point of view, because the unaccounted-for gas had been reduced, and the make of gas had been above 11,000 cubic feet per ton of coal carbonized.

The motion was unanimously carried.

On the proposition of the CHAIRMAN, seconded by Mr. W. A. HARDY, a dividend at the rate of 5 per cent. per annum for the half year was declared, less income tax.

Proposed by Mr. SMITH and seconded by Mr. HARDY, a vote of thanks was passed to the Chairman and Directors, the officers, and the employees of the Company.

The CHAIRMAN, the SECRETARY (Mr. Schultz), and the ENGINEER (Mr. A. E. Brooks) responded. In the course of his remarks, the Chairman observed that he believed the arrangement with the South-Western Railway Company would soon be an acknowledged fact; and, referring to the same subject, Mr. Schultz said he thought it was a good sign that they had at last got the Railway Company to give up making gas in competition with themselves. This would not make their fortune; but it was a good thing to get rid of competition. He hoped that next year there would be an increase in business to show the shareholders, and that the 5 per cent. dividend they had now commenced paying would go on advancing in the future.

This concluded the proceedings.

PROVINCIAL GAS AND WATER COMPANIES.

GAS COMPANIES.

Aldershot.

In moving the adoption of the report, noticed in the "JOURNAL" for the 19th ult., of the Aldershot Gas and Water Company, the Chairman (Mr. A. F. Wilson) remarked that there had been a drop in the revenue of about £130 in the six months ending June 30, caused by the reduction of 2d. per 1000 cubic feet in the price of gas and the dulness of trade at Aldershot. Coke had fallen off to the extent of £1500; but the returns from the other residuals had increased. From the supply of water the revenue had been £3967, which was an increase of fully £100. Rates and taxes were high—in fact, the Company were the largest ratepayers in the town. Reference to the high rates led the Chairman to allude to the opposition offered by the District Council to the Company's last Bill, and to the expenditure on this and their electric lighting scheme. In this connection, he quoted from the speech of Sir George Livesey at the recent meeting of the South Metropolitan Gas Company the portion referring to municipal trading, and remarked that, as the principal ratepayers, the Aldershot Gas Company were entitled to have a word to say in connection with the large expenditure referred to. The money spent on the opposition had been injurious to the town, as it had been the means of preventing a further reduction in the price of gas. Reverting to the electric light, he expressed the hope that his remarks would not be taken in any way to mean that the Company were jealous or afraid of the light in Aldershot. If it was properly managed, and kept within the limits in which it could be made useful, they should not only feel that it tended to the improvement of the town, but as a Gas Company should welcome it. At any rate it had not hurt them. They had been in communication with the War Office as to the relative cost of gas and electricity for lighting the proposed new camps; and they were able to show that the cost was in the proportion of 1d. to 1s.—a very large difference in favour of gas. The report was adopted. Authority was subsequently given to the Directors to issue another £25,000 of new capital in preference shares, together with the necessary loan capital.

Alford.

The Alford Gas Company, of which Mr. Isaac Carr, of Widnes, is Chairman, had their half-yearly meeting on the 23rd ult. The revenue in the six months ending the 30th of June amounted to £716; the expenditure to £595—leaving a balance of £121. Adding this to the amount brought forward, and deducting the half-year's dividend to Dec. 31, 1901, there was left £240 8s. 4d., out of which the Directors recommended the payment of a dividend at the rate of 5 per cent. per annum (less income-tax). This absorbed £147 12s. 7d. and left £92 15s. 9d. to be carried forward. The Directors reported that the sales of gas had been fully maintained; and with the view of encouraging its further use for culinary purposes, a substantial reduction was made in the rents charged for cooking-stoves.

Brighton and Hove.

At the half-yearly general meeting of the Brighton and Hove Gas Company on Friday, the Directors will report that the quantity of gas sold in the six months ending June 30 was a trifle less than that for the same period of the previous year—viz., 541,631,000 cubic feet, compared with 544,174,000 cubic feet; and the rental was diminished by the entire amount of the reduction in price of 3d. per 1000 cubic feet during that time. The gas sold produced a revenue of £82,568; the rental of meters, stoves, and fittings, £6004; the sale of residuals, £16,882; and the total revenue was £105,948. The manufacture of gas cost £55,265; distribution, £13,002; and management, £4189—the total expenses being £77,719. The balance carried to the profit and loss account is £28,229; and the sum available for distribution is £25,535 16s. 8d. The net result of the working is an increase of £13,047 in the profits. The Directors recommend the payment of dividends for the half year at the rate of 6 per cent. per annum on the "B" preference consolidated stock, at the rate of 4 per cent. per annum on the "C" preference consolidated stock, and at the authorized rates on the ordinary capital—viz., 10¾ per cent. per annum on the original stock, and 7¾ per cent. per annum on the "A" stock, an increase in the case of the two last-named stocks of ¾ per cent. per annum. For the payment of these dividends £23,089 18s. is required; and the balance which will remain to be carried forward is £2465 18s. 8d. Under the supervision of the Company's Engineer (Mr. Joseph Cash, M.Inst.C.E.), 34,185 tons of coal and 551,476 gallons of enriching oils were employed in the production of gas, of which 523,577,600 cubic feet were sold to ordinary consumers, and 18,053,400 cubic feet for public lighting. The estimated quantities of residuals produced were as follows: Coke, 19,919 tons; breeze, 4227 tons; tar, 364,509 gallons, and ammoniacal liquor, 843,962 gallons.

Colchester.

The half-yearly meeting of the Colchester Gas Company was held last Friday—Mr. Charles Coleman presiding. The accounts presented showed that the gas-rental for the year amounted to £9169, and the meter-rental to £193; while there had been received from the sale of coke £1570, from tar £404, and from sulphate of ammonia £400. There had been expended for coal £4540, for salaries and wages £1575, for rates and taxes £1106, and for repairs and maintenance £860. The profit on the year amounted to £2071, and dividends of 10 per cent. on the "A" and 7 per cent. on the "B" shares were declared.

Cork.

The ordinary general meeting of the Cork Gas Consumers' Company was held at the offices last Friday. The accounts for the six months ending June 30 showed, as compared with the corresponding period of previous years, an increase in the rental, owing principally to the extended use of gas-stoves for cooking and heating, and to the large number of small consumers supplied through prepayment meters. The gas-rental amounted to £21,075, and the total receipts to £28,649. The expenditure was £21,951; leaving £6698 to go to the profit and loss account. After placing to the credit of the depreciation fund £1589, and to the reserve for bad debts £200, the balance of this account was £3433, out of which it was proposed to pay a dividend at the rate of 5 per cent. per annum. Accompanying the report was one by the Consulting Engineer (Mr. Joseph Hepworth, M.Inst.C.E.), in which he stated that he had recently inspected the works, and found that the plant not then under repair was in good working order and condition. The apparatus undergoing repair included the washers, one of the gasholders, and the iron fittings of the new retort-bench, which were being dealt with in a satisfactory manner, and would doubtless be completed before the winter requirements set in. The gasholder which was destroyed at the time of the strike had been replaced by one of excellent workmanship. He advised that the sulphate of ammonia plant should be thoroughly overhauled next year. His inspection altogether gave him the assurance that the works were gradually being brought into an excellent state of repair and efficiency to meet an increased demand for gas.

Douglas.

The report presented at the recent half-yearly meeting of the Douglas (Isle of Man) Gas Company set forth that for the current half year there would be a reduction of 2d. per 1000 cubic feet in the price of gas, bringing it down to what it was before the abnormal rise in coal two years ago. The net profits were £3852, making, with the balance brought forward, £7673 available for distribution. The usual dividend of 30s. per share was paid, £500 was placed to reserve, and the remainder carried forward.

Eastbourne.

A very satisfactory position of affairs was revealed at the half-yearly meeting of the Eastbourne Gas Company last week; but this fact did not prevent a certain amount of opposition being evinced by a few of those present—Mr. H. M. Simmons, as before, rendering himself conspicuous in this regard. The meeting (which was presided over by the Chairman, Dr. G. A. Jeffery, J.P.), was held for the first time in the Company's new offices. In the course of their report, the Directors stated that the revenue account showed a profit for the six months of £7319, which, added to the balance of £11,266 brought forward after paying the dividend in February last, and after deducting £205 for interest, made a total of £18,380 to the credit of the profit and loss account. Mention was also made of the retirement of Mr. J. H. Campion Coles from the position of Secretary, after 46 years of valuable service, and of the appointment of Mr. James S. Garrard to the office thus vacated. The Chairman said the Company now possessed 6456 consumers; and in the period under review the gross income for gas had increased by £650. The sale of gas (154,833,000 cubic feet) showed an increase of 4,586,000 cubic feet, or equal to 3¾ per cent. Looking at the very moderate price at which the gas was sold, and the

handsome provision in the accounts or depreciation, as well as the ordinary wear and tear, the Company might, he thought, be considered to be in a very prosperous condition. The report was adopted; and dividends were declared for the half year at the rate of 14½ per cent. per annum on the original capital and "C" shares, and 11½ per cent. on the "B" shares. The Chairman next proposed that a pension of £250 a year should be granted to the late Secretary (Mr. Coles). After some considerable discussion—which was kept alive chiefly by Mr. Simmons—this was agreed to; and thereafter the appointment of Mr. Garrard as Secretary, at a salary of £300 a year, was confirmed. The Chairman, in replying to a vote of thanks, said that, low as was the price of gas at the present time, he hoped at the next meeting to have the pleasure of informing the shareholders that another 2d. had been taken off it. A further somewhat acrimonious discussion with regard to the Directors' remuneration having taken place, the meeting concluded with a vote of thanks to the Manager (Mr. John Hammond).

Enfield Gas Company.

The half-yearly general meeting of the Enfield Gas Company was held on Thursday—Colonel Sir Alfred Somerset, K.C.B., in the chair. The adoption of the Directors' report, recommending a reduction in the price of gas of 3d. per 1000 cubic feet, was moved by the Chairman and seconded by Mr. A. Ford, who congratulated the shareholders on the flourishing position of the Company. The report was adopted unanimously. The reduction in the price of gas will be much appreciated by the Enfield public. There is a distinct improvement in the lighting of the district by the new incandescent lamps, which have now almost entirely taken the place of the old burners.

Farnworth.

Mr. J. W. Watkinson, Chairman of the Directors, presided at the half-yearly meeting of the Farnworth and Kearsley Gas Company last Thursday. The report and balance-sheet presented showed that the profit arising from the operations of the Company during the six months ending June 30 amounted to £1745; and with this and a sum of £845 drawn from the reserve fund (which amounts to upwards of £15,000), the Directors were able to recommend the payment of the usual maximum dividends of 10 and 7 per cent. per annum. The Chairman moved the adoption of the report, and the motion was carried.

Hartlepool.

The annual general meeting of the Hartlepool Gas and Water Company was held last Thursday—Mr. W. H. Fisher, J.P., in the chair. The report presented by the Directors showed that the balance on the net revenue account was £36,020; and a dividend at the rate of 5 per cent. per annum was recommended—making, with the interim dividend, 10 per cent. for the year. In moving the adoption of the report, the Chairman said the gas made in the year established a record, and for the twelve months to June 30 the make was 451,144,500 cubic feet, an increase of 15,232,400 cubic feet (equal to about 3½ per cent.), on the previous year. It was quite evident, he thought, that customers had found that incandescent gas gave a better and more brilliant light, and was much more economical, than the electric light. The net profit from gas was £19,727 17s. 2d., and from water £15,764 1s. 1d., against which they had, of course, two half-years' dividends to pay. The number of consumers had increased to 11,699—an increase of 735 on the year; and there was also an increase in the number of public lamps. The new contracts the Directors had been able to make for coal and oil would further reduce the cost of production; and they had therefore decided to still further reduce the charge for gas by 1d. per 1000 cubic feet from the 1st of July last—making the price lower than it had ever been before. The demand for water also continued increasing, 563,448,213 gallons having been sold for manufacturing purposes—an increase of 33,990,145 gallons; and for domestic use there had been a consumption of 832,552,649 gallons, or an increase of 84,665,051 gallons. The report was adopted; and the dividend declared. At the close of the ordinary business, an extraordinary meeting was held, at which a resolution was passed empowering the Directors to borrow £5000 under the Company's Act of 1898, and £6250 under the Act of 1900, on mortgage or bond.

Keswick.

At the ordinary general meeting of the Keswick Gas Company today, the accounts presented will show that, after allowing for the depreciation of cookers, there is a balance of £1124 13s. 5d. on the working for the year ending June 30, which with 16s. 7d. bank interest, makes £1125 10s. Deducting from this amount £80 for interest on loans, and £70 10s. 6d. paid for income-tax, there remains £974 19s. 6d. The Directors propose a dividend at the rate of 8½ per cent. per annum on the original capital, and at the rate of £5 19s. per cent. per annum upon the additional capital. This will absorb £845 15s., leaving £129 4s. 6d. to be added to the profit and loss account.

Riddings.

The half-yearly general meeting of the Riddings District Gas Company was held last Friday, when the accounts presented showed that the sale of gas for public and private lighting in the six months ending the 30th of June produced a revenue of £2303; the total receipts being £2748. As the expenditure amounted to £1974, the sum carried to the profit and loss account was £774. The balance on this account amounted to £2899, out of which the Directors recommended the declaration of a dividend for the half year at the rate of 7 per cent. per annum, free of income-tax.

Rugby.

The Directors of the Rugby Gas Company reported, at the half-yearly general meeting last Friday, that the affairs of the Company were in a satisfactory condition. The receipts on revenue account for the six months ending the 30th of June amounted to £8975 16s. 2d., and the expenditure to £6464 12s. 8d.; leaving a balance of £2511 3s. 6d. to be carried to the profit and loss account. This, added to the £4430 10s. remaining after payment of the dividend for the half year ended the 31st of December last, and £10 3s. 7d. interest on moneys deposited, less £148 4s. 3d. interest on mortgage, produced a net balance of £6803 12s. 10d. The Directors recommended the payment of an interim dividend for the half year at the rate of 13 per cent. per annum, less income-tax, amounting to £2178 5s. 11d.; the balance to be carried forward. The works, under the supervision of the Engineer (Mr. Charles Meiklejohn), were stated to be in good order.

Salisbury.

At the recent annual general meeting of the Salisbury Gas Company, the Chairman (Mr. G. Fullford), in moving the adoption of the report and the payment of the usual dividends, ranging from 5 to 10 per cent. per annum on the various classes of shares, said the results of the past year's working showed a continuance of the greater demand for gas which had now been so satisfactory a feature for some years, and afforded proof that the shareholders could again congratulate themselves on the steady progress and sound position of the business. The increased sales and a reduction in the cost of coal, under the new contracts, enabled the Directors to recommend that, on and after the 29th of September, the price of gas should be reduced 2d. per 1000 cubic feet. The sales of residuals had been well maintained. Mr. W. Young seconded the motion. Mr. Okes observed that while some gas companies had found a slight decrease in sales during the earlier part of the year, the general experience had shown an important rise since the 1st of July. He noticed that in Salisbury there was an increase on the year's sales, and would be glad to know if this was still being maintained. The Chairman said the report of the output during July, as submitted to the Directors that morning, showed an increase of 7 per cent. as compared with July, 1901. The motion was then carried unanimously. A vote of thanks having been accorded to the Chairman, the Directors, and the staff, the Engineer and Manager (Mr. Norton H. Humphrys, Assoc.M.Inst.C.E.), replied on behalf of the staff, who, he said, would highly appreciate the kindly recognition of their endeavours to advance the interests of the undertaking. The price of coal during the past year or two had been a great difficulty, and he was thankful they were emerging from that dark cloud. He gave some details of the slot meter department, and the maintenance of incandescent lights, &c. The meeting then closed.

Sunderland.

The annual report of the Sunderland Gas Company sets forth that the total revenue was £121,762, and the expenditure £108,793; leaving a balance of profit on the year's working of £12,969. The decrease in the revenue of the Company consequent upon the reduction in the price of gas, which took effect from July 1, 1901, and the fall in the value of residuals, have been partially recouped by lower coal prices and increased gas consumption. An interim dividend was paid in March last; and the Directors recommend the declaration of a like dividend of 5 per cent. on the original stock, and of 4¼ per cent. on the additional capital.

Waltham Abbey and Cheshunt.

At the half-yearly general meeting of the Waltham Abbey and Cheshunt Gas Company last Friday, the accounts presented showed that the revenue from the sale of 13,876,800 cubic feet of gas in the six months ending June 30 last amounted to £2513, and that the total receipts were £5358. The expenditure on the manufacture of gas was £2621; and the total expenses came to £3642—leaving £1716 to go to the net revenue account. The balance available for distribution was £2432, out of which the Directors recommended a dividend on the "A" shares at the rate of 8 per cent. per annum, and on the "B" and "C" shares at the rate of 6 per cent. per annum; leaving the balance to be carried forward. The continued low prices for coke prevailing during the half year again influenced the revenue adversely; but the Directors were able to report that contracts entered into for the supply of coal and oil for the current twelve months are on terms more favourable to the Company than those of last year. Under the supervision of Mr. W. Bince Randall, the Company's Engineer and Secretary, the works and plant were maintained in a condition of thorough efficiency. At the conclusion of the ordinary meeting, a special meeting was held, at which the shareholders sanctioned the issue by the Directors of the remainder of the additional share capital, to rank with the existing capital raised under the Company's Order of 1881, also of the remainder of the debenture capital under the borrowing powers thereby conferred.

Waterford.

The annual meeting of the Waterford Gas Company was held on the 22nd ult.—Mr. G. D. Lynch presiding. In moving the adoption of the report, the Chairman remarked that the extension of the borough boundary and the Company's business had necessitated the expenditure of capital in distributing plant which had not become reproductive; but it enabled them to meet the wishes of the Corporation and the consumers. The use of gas for cooking and heating was largely increasing; and the augmented consumption resulting therefrom would call for the erection of a new holder in the tank which was ready to receive it. For these and other extensions, further capital would probably be needed before long. The Directors had decided to reduce the price of gas 3d. per 1000 cubic feet for all purposes from the end of the current quarter. The report was adopted, and a dividend for the past half year at the rate of 5 per cent. per annum was declared; making with the interim dividend this amount for the year.

Watford.

The ordinary half-yearly meeting of the Watford Gas Company took place last Thursday, at the Company's works, Bushey, when Mr. W. T. Coles, J.P. (Vice Chairman), presided in the absence of Mr. E. J. Slinn, the Chairman, through illness. The balance-sheet showed that the profit on the half-year's working had been £2797, while in the profit and loss account there was a balance of £3133. The report and accounts were adopted. A resolution was afterwards unanimously passed empowering the Directors to raise £15,000 of new capital. The great increase in the demand for gas has made it necessary for the

Directors to have a new holder, with a capacity of 500,000 cubic feet, which is now in course of erection. Other works entailing capital expenditure, and necessitated by the great increase in the consumption of gas, will also have to be undertaken shortly.

Wellingborough.

At the meeting of the Wellingborough Gas Company on Monday last week, the accounts presented showed that the sale of 58,448,977 cubic feet of gas for private lighting and 2,281,875 cubic feet for public lighting in the six months ending the 30th of June produced a revenue of (inclusive of unclaimed discounts) £8495, while the total receipts were £11,213. The expenditure being £8564, there was a sum of £2649 to go to the profit and loss account, the balance on which was £3934. The Directors recommended that a dividend of 6 per cent. on the "A" and "B" shares, and of 4½ per cent. on the "C" shares, free of income-tax, should be paid. In their report, they expressed pleasure in stating that the business of the Company showed a continued increase; 301 additional meters and 321 cookers having been fixed during the half year, and more than 8 per cent. more gas sold than in the corresponding period of 1901. Comparing the past six months with the first half of 1892, they showed that the make of gas had gone up from 24,156,000 to 61,229,000 cubic feet, being a rise of 153 per cent. The increase for the month of January was 118 per cent., while that for June was 265 per cent.; showing that the rapid growth of the Company's business was largely due to the extended use of gas for cooking and motive power. The report was adopted. According to the working statement of the Manager (Mr. J. T. Lewis) for the twelve months to June, the quantity of coal used was 11,683 tons; the production of gas being 127,674,000 cubic feet, or at the rate of 10,928 cubic feet per ton; the quantity sold being 125,454,000 cubic feet, or 10,738 cubic feet per ton. The unaccounted-for gas was 1·06 per cent. The capital expended per ton of coal at the close of the year was £5 0s. 2d. The coke for sale was 10 cwt. 3 qrs. 17 lbs. per ton of coal. The number of meters in use was 3361, being an increase of 585 in the twelve months; the cookers on hire numbering 1742, or 582 more than in June, 1901.

Willenhall.

The report which was adopted at the last half-yearly meeting of the Willenhall Gas Company stated that the sales of gas once more showed a very gratifying increase, due chiefly to the steady development of the prepayment meter system; 106 additional meters of this class having been fixed during the six months ending June 30. The revenue from the sale of residuals, however, was not so satisfactory; the selling price of coke particularly having fallen to an unprecedentedly low figure. There was a balance of £2517 on revenue account; and dividends were declared at the rates of 5½, 2½, 4¼, and 4 per cent. on the "A," "B," "C," and "D" shares respectively. This absorbed £1588, leaving £929 to be carried forward to the next accounts. The Directors have decided to reduce the price of gas by 2d. per 1000 cubic feet to ordinary consumers, as from the 30th inst.

Wolverhampton.

The ordinary general meeting of the Wolverhampton Gas Company was held last Tuesday—Mr. H. Ward (Chairman) presiding. The accounts presented showed a net profit for the past half year of £8478. In moving the adoption of the report and accounts, the Chairman said that since the last meeting new ordinary stock to the amount of £10,235, for the purpose of extending the prepayment meters and cookers, had been issued, and the whole fully paid up. This was sufficient for their present needs, and they had £5000 or £6000 left, which could be issued without further sanction by the shareholders. They had received from the sale of coke and residuals £6470 less than in the corresponding half of last year; but against this coal had cost less by £6432. The result was that the drop in the price of coal had not been equivalent to the amount taken for coke; and if they had not secured better prices for sulphate of ammonia towards the latter half of the year, their accounts would not have been so good. Mr. S. Loveridge seconded the motion; and it was carried. Dividends were declared of 3 per cent. upon the preference stock, 5 per cent. upon the consolidated stock, and 3 per cent. upon the new ordinary stock.

WATER COMPANIES.

Cleveland.

The Directors of the Cleveland Water Company, in their 68th half-yearly report, state that, after providing for all expenditure, there remains a balance of £5356, enabling them to recommend the payment of a dividend at the rate of 10 per cent. per annum on the original and "A" shares, and of 7 per cent. per annum on the "B" shares (less income-tax), with £125 reserved for contingencies. This will absorb £3525, and leave a balance of £1831 to be carried to the credit of next half-year's account.

East Worcestershire.

The Directors of the East Worcestershire Water-Works Company were able, at the 46th half-yearly meeting of shareholders last Thursday, to recommend an increase in the dividend to 4½ per cent. Lord Windsor presided, and, in moving the adoption of the report, which showed a profit for the six months of £2973, asked the shareholders to bear in mind, when regarding the comparatively small sum recommended for division, that the revenue they were now deriving from Birmingham would last only so long as the public had undertaken to have their water; and though he still considered they were perfectly justified in incurring the extra expenditure necessary to give Birmingham this supply, the shareholders must expect a portion of this revenue, which they could receive for only a limited period, to be placed against the capital expenditure. It was only after careful consideration that the Directors had recommended the small increase of ½ per cent. in the dividend, and in the full confidence that this increase would be maintained after Birmingham had ceased to take their supply; and they hoped the shareholders would endorse the policy of increasing the dividend only to a figure which there was reasonable prospect of maintaining. The report was unanimously adopted, and a resolution was proposed by the Chairman, and carried, to the effect that the depreciation reserve fund, which would now amount to £8056, should be credited to capital expenditure in respect of the rebate of £5 per share on 956 shares issued at a discount in 1889, which would require £4780, and the balance on account of depreciation of the mains.

Lewes.

The accounts submitted at the annual meeting of the Lewes Water Company last week showed that the receipts for the twelve months ended June 24 (less £37 for empty houses and irrecoverable rents) amounted to £4272. The expenditure was £1757; so that the sum available for dividends was £2515. The Chairman, in proposing the adoption of the report and balance-sheet, said it was a matter of pleasure to be able to claim that satisfactory progress had been made during the past year. The trading had, in fact, been very successful. The directors had endeavoured to carry on the business in a fair, straightforward, and honest manner; and while, on the one hand, they had been careful with regard to the expenses, on the other they had kept the works and the other property in an efficient condition. The rental had only increased by a small amount; but there had been a net decrease of £108 in the expenses. The report was adopted; and a dividend was declared at the rate of 5 per cent. upon the original share capital, making, with the interim dividend, 10 per cent. for the year.

Luton.

At the 69th half-yearly meeting of the Luton Water Company on Thursday—Mr. B. Seebohm presiding—the Directors' report set forth that, after allowing a rebate of 7½ per cent. on the water-rates and sales for the past half year, amounting to £420, a net profit of £2782 remained for paying the maximum dividend. The Company's Analyst reported that the condition of the water continued to be excellent. The Chairman mentioned that the water-rates showed an increase of £90, and £236 had been spent for engine repairs and renewals. Rates and taxes had gone up from £655 to £808, as compared with last year; and he was afraid there would be about £100 more on this head in the next. This was due to the recent reassessment of the works. Still, they had been able to cover their rebate of £420, and he thought there was every possibility of their continuing to do so. The maximum dividend was then declared.

South Hants.

The Directors of the South Hants Water Company presented a highly favourable report at their recent half-yearly meeting. In the six months ending the 30th of June the rental increased by £692; 394 additional houses having been supplied with water. The profit and loss account showed an available balance of £5624. The interim dividend declared was at the rate of 7½ per cent. per annum on the 10 per cent. maximum shares, of 5¼ per cent. per annum on the 7 per cent. maximum shares, and of 3¾ per cent. per annum on the 5 per cent. maximum shares. The works of the Company were reported to be in an efficient state.

South Staffordshire.

The half-yearly general meeting of the South Staffordshire Water Company was held last Thursday—Mr. Frank James in the chair. In moving the adoption of the report, noticed last week, he pointed out that the reduction in the price of coal, which had enabled them to effect a saving of £1400 in engine charges, might be expected to continue. After providing for interest on debenture and preference stock, the amount remaining for division, including the balance of £6762 from the previous half year, was £24,536 19s. 10d.; and the Directors recommended a dividend on the ordinary stock at the rate of 6 per cent. per annum. He proceeded to refer to the increasing rates, and remarked upon the tendency of local authorities to put large assessments upon the big companies and works, whose cheques for lump sums were easily received. He noticed that the Chairman of the London and North-Western Railway Company had stated that the Company's rates were equal to a dividend of 1 per cent. But their own rates were equal to nearly 2 per cent.; and in spite of this they were always in trouble with their assessments, and were now fighting a case which might end in an appeal. However, though they had no desire to escape legitimate liabilities, they were bound to resist anything in the nature of an excessive demand. So far as the public were concerned, they were never better supplied with water, alike as to quantity and quality, than they were at present. Everything had been done in the way of alterations and additions to secure a capital supply of water for the entire district. The report was adopted.

West Surrey.

The half-yearly general meeting of the West Surrey Water Company was held last Thursday, at the London offices—Mr. A. Telford Simpson in the chair. The accounts, prepared by the Secretary (Mr. H. G. Thompson), showed that the income for the six months ending the 30th of June, after making provision for empty houses, irrecoverable rates, &c., amounted to £5617 13s. 9d. (£5817 13s. 9d., less £200), and the expenditure to £2023 3s. 3d. Comparing the accounts with those for the corresponding half of 1901, the income exhibited an increase of £303 9s. 9d., and the expenditure a decrease of £44 0s. 10d. After transferring from revenue £350 to the contingency fund, the amount available for distribution was £4708 15s. 1d., which the Directors recommended should be applied as follows: To payment of dividends upon the preference shares, amounting to £536 10s.; to the payment of the maximum dividend at the rate of 7 per cent. per annum on the ordinary shares issued under the Acts of 1877 and 1888, and at the rate of 7½ per cent. per annum on the ordinary shares issued under the Act of 1869; amounting in the whole to £2214 13s., and leaving a balance of £1957 12s. 1d. to be carried forward. The recommendation was agreed to. There were 1629 yards of 3-inch cast-iron pipes laid for the extension of service-mains, and 123 additional supplies connected, representing a future rental of £297 14s. 7d. per annum. The Engineer and Manager (Mr J. K. Hill, M.Inst.M.E.) reported that the whole of the Company's plant, filter-beds, reservoirs, mains, and works were in good order.

WIDNES GAS AND WATER SUPPLY.

Inspection of the Works.

The members of the Widnes Town Council and the public officials recently made the annual inspection of the corporate estate. On reaching the gas-works (which, with the water-works, are, as our readers are aware, under the able supervision of Mr. Isaac Carr, M.Inst.C.E.), they were found to be in excellent order, and the plant was working with high efficiency. The total consumption of gas for the period between March 26 and Aug. 28 showed an increase over the corresponding period of the previous year. The various portions of the plant were inspected with keen interest; the sulphate-house claiming the special attention of many of the councillors. A feature of much interest in the retort-house was the hydraulic main, which, on account of being inclined, allows the tar to flow continuously—the effect being to free the pipe from tar, which, if not kept on the move, would become almost unworkable. This idea originated with Mr. Carr's brother, the late Mr. William Carr. Another interesting feature was the carburetting plant, which, though inexpensive in first cost, is found to be very effective in operation; one of its advantages being that light spirit can be used instead of benzol, should the price of the latter increase. During the inspection, some statistics were given as to the cost of producing gas at Widnes. In 1895, it worked out to 8·5d. per 1000 cubic feet; but it has been gradually reduced until last year, notwithstanding the high price of coal, gas was produced at the rate of only 6·1d. per 1000. The total cost of production, including the standing charges, worked out at about 11·5d. last year, as compared with 1s. 4½d. in 1895. That these improvements are very largely due to Mr. Carr is shown by the fact that in 1881, the year previous to his appointment, when the residuals were worth more than double their present value, the cost of production and distribution was 1s. 2·2d. per 1000 cubic feet, compared with 6·1d. now. This represents a saving to the consumers of more than £8000 per annum, due entirely to economies effected in the working. Then, again, in 1881 the number of consumers was only 600; compared with 6000 at present; and the annual consumption was 60 million cubic feet, against 225 millions now.

On leaving the gas-works, the company returned to the Town Hall, where luncheon was partaken of, after which the Isolation Fever Hospital at Halton View came under notice. At the entrance to the hospital grounds, Mr. Carr pointed out the fact that recent alterations to the water-mains had made it possible to cope with any fire that might occur. From the hospital, the party inspected the water-works. They went first to Stock's Well, where there is one engine with a pumping capacity of 1½ million gallons per day, each stroke raising 60 gallons. Proceeding to Netherley, the plant was inspected with great interest. The pumping capacity of the two engines working here is 5½ million gallons per day. When it is stated that the daily average consumption is at present about 2½ million gallons per day, it will be seen that the town is well provided with water, and, even in the event of the supply becoming exhausted, the Corporation possess an excellent supply at Belle Vale, about half-a-mile from Netherley, which has not yet been tapped. As far as the quality of the water is concerned, it is beyond reproach.

The visits closed with a dinner, in the course of the proceedings at which stress was laid by Alderman Quinn upon the fact that during the past year's working the Gas and Water Committee had been able to supply gas to the consumers at a profit, while most boroughs had had to increase their price.

THE CYCLING ACCIDENT TO MR. RICHMOND.

The brief announcement in the last number of the "JOURNAL" (p. 548) of the unfortunate accident which occurred while cycling in the west of Cornwall to Mr. E. W. T. Richmond, has unhappily turned out to be more serious than we expected. Happily there was no truth in the alarming reports which appeared in the London and Plymouth morning and evening papers last week; neither is there any authority for the circumstantial and exaggerated accounts of the accident in several of the halfpenny journals, which gave much pain to Mr. Richmond's many friends. The facts are as follows: Mr. Richmond and a party of friends were engaged in a cycle tour, starting at Newquay and intending to do a circular trip *via* St. Ives, Land's End, Penzance, St. Austell, and back to Newquay—a distance of about 80 miles. The first two days' rides were safely accomplished; and the party reached Land's End on the Saturday evening, leaving there at noon on Sunday for Penzance *via* Treryn and St. Buryan. The route is very hilly in this neighbourhood; the Treryn hill being a particularly dangerous one. There is, however, no C. T. C. "Danger" board at the top of the hill; and the party rode down it, thinking it quite safe. About 250 yards from the bottom of the hill, there is a sharp turn, and the gradient becomes worse. It was at this point that the danger existed, for the hill was crowded with waggonettes and excursionists going to Land's End. Safely negotiating the sharp turn, Mr. Richmond was confronted with the traffic; and after clearing the first two or three vehicles, he appeared to be back-pedalling vigorously—the front wheel brake having broken some time previously. Before, however, he could gain the bottom of the hill, another vehicle was in the way; and it would seem that, in trying to pass this carriage, Mr. Richmond swerved, and the machine apparently struck a projection in the road, throwing the rider rather heavily. Fortunately Dr. J. F. Atkins, Chief Medical Officer at Tangye's works, Birmingham, was one of the party; and he quickly rendered aid. Afterwards Dr. Jago, of St. Buryan, appeared on the scene; and Mr. Richmond was removed to a farmhouse hard by, being treated with characteristic Cornish kindness by the village folk. Dr. G. E. Richmond, late Medical Officer to the Imperial Yeomanry Hospital, lately returned from South Africa, and Dr. Symons, of Penzance, arrived; and, after consultation, they announced that, though the accident was a serious one, there were no bones broken, and no operation was necessarily indicated.

We are glad to learn that the patient makes a steady, if slow, improvement each day; and his many friends will be pleased to hear that the physicians agree that the progress is very satisfactory. In addition to this gratifying news, we have been asked to convey Mrs. Richmond's heartfelt thanks to those friends who have sent so many kind and cheering messages of inquiry and sympathy. A pleasing incident in connection with the unfortunate accident was that the employees spontaneously, at the stove works at Warrington and Stratford and the meter works at Chelsea and Oldham, sent deputations of their workmen to the Directors at their respective works, and asked that resolutions of sympathy of the workmen with their respected chief be conveyed to Porthcurno with all speed.

We regret that a telegram received shortly after noon yesterday announced that Mr. Richmond's condition was "not quite so favourable" in the morning.

ABERDEEN CORPORATION GAS AND ELECTRICITY UNDERTAKINGS.

The Accounts for the Year.

The accounts of the Aberdeen Corporation Gas and Electricity undertakings for the year ending July 31, as prepared by Mr. P. M. Cran, C.A., Gas Treasurer, have been issued. They show, in the Gas Department, a total revenue amounting to £113,802, as compared with a revenue of £112,905 in the preceding year; and an expenditure of £96,216—leaving a balance of £17,586 to be carried to net revenue account, which, with a balance of £580 brought down, amounts to £18,166. The largest item of income is, of course, gas and meter rents, which amounts to £93,701, as compared with £91,681. Residual products have realized £16,856, of which £2017 was derived from house services, £1083 from gas-stoves, and £139 from feu duties. On the expenditure side, the heaviest item is £79,353, of which £55,144 was for coal, and £12,342 for wages of stokers and labourers. Maintenance of plant cost £4573; and salaries of the Engineer, Analyst, and officers at works £1329. The distribution of gas, which includes £1297 as wages of meter inspectors, cost £3314; house services, £1611; gas-stoves, £1083; rents and taxes, £4852; and management, £1824, which includes £1164 for salaries. A sum of £620 is set down for general charges, of which £134 is for pensions and allowances. Discount amounted to £3555, of which £381 is set down for bad debts. The total capital expenditure at July 31 amounted to £311,100; the largest item being that for apparatus—namely, £120,779. The statistics as to the manufacture of gas brings out that the quantity of coal carbonized was the largest in the history of the undertaking, amounting, as it did, to 62,507 tons, as compared with 61,490 tons in 1901, the previous highest record. The average price of coal per ton was 18s. 11d., as compared with 21s. 9¾d. in the previous year, which was the highest price since 1879, when it was exactly the same. The highest price ever paid per ton was 29s. 7¾d. in 1874. The quantity of gas made during the year was 626,653,000 cubic feet, the highest on record. The quantity accounted for was 590,372,000 cubic feet, the loss amounting to 5·79 per cent., which is the smallest percentage on record, and compares favourably with 7·13 per cent. the previous year. The average quantity made per ton of coal was 10,025 cubic feet; and gas-rentals amounted to £93,701, as compared with £93,076 the previous year. The price of gas was 3s. 2d., the same as the previous year. The annuity account shows that there are 17,601 annuities of 5s. each, amounting to £4400. During the year, 458 annuities were redeemed, the purchase price being £3658. The total number of annuities redeemed is 8399, and the purchase price has been £64,512, or adding the unapplied balance, £70,298. Borrowing powers have been exercised to the extent of £137,016, but of that amount £52,251 has been paid off, leaving the mortgage debt on July 31 at £84,765. The Committee recommended that the price of gas be reduced from 3s. 2d. to 3s. per 1000 cubic feet. In the Electricity Department, the revenue was £23,139, as compared with £19,176 in the preceding year. The sale of current produced £22,317, of which £2035 was for public lighting, and £3179 was for current used for traction purposes. The total expenditure was £10,499, and the balance is £12,640, which is subject to charges for sinking and reserve funds and depreciation. The capital account amounts to £173,572, of which £72,690 was expended last year.

The Intensified Gas-Light Company's Patents.—The sale of the patents of the above-named Company, now in voluntary liquidation, took place, in accordance with the announcement which appeared in the "JOURNAL" for the 12th ult., last Wednesday, at the Company's premises; Messrs. Ventom, Bull, and Cooper being the auctioneers. The price realized was £350, for patents which cost the Company, in cash and shares, £25,000.

Inadequate Supply of Water at a Fire.—A destructive fire occurred last Tuesday night, at the premises of Messrs. Reeve and Co., outfitters and house furnishers, Market Street, Watford, and great public indignation is the result of the knowledge that the outbreak might have been reduced to very small proportions if there had been an adequate supply of water for its suppression. For half an hour after the arrival of the brigade it was found impossible to obtain water in sufficient quantities to enable them to cope with the fire. The water-works are the property of the District Council, and a special emergency meeting of the Fire Brigade Committee was held on Thursday to consider the best means of remedying what was complained of.

THE PUBLIC LIGHTING OF SYDNEY.

What Gas has Accomplished.

In view of the decision of the Sydney (N.S.W.) City Council to have the city lighted by electricity instead of gas, a representative of the "Sydney Morning Herald" obtained from Mr. R. J. Lukey, J.P., the Secretary to the Australian Gaslight Company, the following particulars of the work of lighting Sydney with gas as carried out by the Company.

At present the lighting of the city costs the Council some £14,000 per annum; and Mr. Lukey stated that the Company made very little profit out of it. They had always met the Council in the most friendly manner, and when it had been possible to make a reduction in the price of gas, they had given them the benefit of it. Prior to 1871, the Company charged £10 per lamp per annum, as per agreement. In 1871, however, a fresh agreement was entered into, under which the charge was £7 12s. 6d. At that time there were 917 lamps in the city. Since then, however, the number had been steadily increased, until now, after a lapse of some 31 years, there were 2882 in use. During that long period, the Company had voluntarily reduced the price from time to time, until it fell as low as £4 per lamp per annum. At that time, however, it was the practice not to light the lamps for the five nights in each month at the time of full moon. Then the Council decided that they should be lighted every night all the year round; and this was done at an added cost of 10s. per lamp, making the annual charge £4 10s. In connection with these lamps, the Company provided everything—pillars, lamps, burners, &c.—erected them, and kept them in order. In 1897, they converted the old jets into the present system of incandescent burners without any cost to the Council, but at an outlay of £4000 by the Company. In connection with this matter, Mr. Lukey incidentally stated that it cost the Company no less than £11,000 to alter the lamps of the whole of the city and suburban municipalities to the new system, without any charge whatever to the different Councils interested; but, as already stated, the cost of converting the lamps within the area of the Municipality amounted to £4000. In addition to the cost of providing each pillar, lamp, and burner, and the expense of erection, the Company had to maintain them in working order. As each lamp would, on an average, require six mantles per annum, and these were supplied by the Company without charge to the Council, a very small margin of profit was left. Mr. Lukey said he had heard visitors from the Old World remark on the excellent lighting of Sydney. It could be still better lighted if the Council would have more cluster burners, some of which were placed at various points in the city. Mr. Lukey called his interviewer's attention to the extraordinary results obtained with the "Lucas" lamp. While declining to enter upon any statement as to the merits of gas as compared with electricity, he said he claimed that gas was the cheaper illuminant, and that this was the experience in England. Gas was not only cheaper for lighting purposes, but it would also supply power for driving engines of more than 200-horse power; and in Sydney many gas-engines were used—as great a limit as 40-horse power being reached.

ISLINGTON IN DARKNESS.

Remarkable Occurrence.

Last Tuesday night, a serious fire occurred at the electric light station of the Islington Borough Council, in Eden Grove, Holloway, the effect of which was to plunge the district in darkness—compelling tradesmen to close their shops, and interfering seriously with pedestrian and vehicular traffic. The outbreak was discovered on the ground floor about half-past seven; and its severity may be estimated from the fact that by the time the Fire Brigade arrived the whole of the lower premises were involved. Fortunately, however, the upper portion was saved. The fire originated in the main switchboard room, and it was followed by the extinction of the electric lights in about ten miles of streets. Happy was the position of those who had not banished the old and well-tried illuminant in which our readers are interested, for it stood them in good stead in the sudden darkness which came upon them. In a few moments hundreds of people had collected round the gates of the works; and it was with great difficulty that they were driven back into the broader thoroughfares of the Holloway Road. Thanks to the promptitude of the men engaged at the station, the fire was confined to the building in which it broke out. A conspicuous object in the prevailing gloom was the well-known Angel Inn, at the corner of the Pentonville Road and High Street, Islington, which, being in the Clerkenwell parish, was served by the County of London and Brush Provincial Electric Light Company from the City Road station, made quite a brilliant display. The cause of the fire was explained to a representative of a London morning paper, by one of the officials at the station, as follows: "One of the cables leading into the street developed a fault. When you have an escape of electricity you have heat. This fault occurred at the worst possible point—just where all the cables come down from the switchboard. The consequence was that they all got alight and cut off the entire service. The fire itself was not a serious one, and the greatest possible credit is due to the staff, as they practically got it under before the arrival of the Fire Brigade."

The following is the account of the occurrence given by the "Electrician": "Shortly after 7.30 p.m. on Tuesday, a cable became ignited at the back of the switchboard at the electricity works of the Islington Borough Council, owing, it is thought, to the development of a fault. The cable in question was a 19/16 rubber insulated concentric steel-armoured Silvertown cable, and fed the Caledonian Road transformers. Its fuse on the switchboard did not blow, however; and as the various cables at the back of the switchboard from the machines, feeders, &c., were not isolated from each other in any way, the fire naturally spread to them, and a series of dead shorts occurred and fuses commenced to blow. Immediately the fire was discovered, efforts were made by the staff to overcome it by means of sand; but they were not successful. The Fire Brigade were quickly on the scene, and soon subdued the flames; but, in the meantime, all machines were shut down, and the whole of the area supplied from the works was plunged into darkness. Practically every cable behind the switchboard was seriously damaged either by fire or water; but the board itself, curiously enough, escaped injury. Neither Mr. Gay, the Engineer and Manager, nor Mr. Yeaman, his Chief Assistant, was in the station at the actual moment of the outbreak; but they arrived within a few minutes, and the work of reconstruction was commenced without delay. The switchboard was taken to pieces, thoroughly cleaned and dried, and erected again. All through the night the staff worked, and did not cease until 6.30 p.m. the next day, when they had the satisfaction of switching the machines on to some of the mains once more. We believe that work was actually in progress whereby each cable would have been isolated from all the others, so that should one become ignited the fire would be prevented from spreading. Unfortunately, this accident occurred before the scheme could be consummated. The switchboard gallery consists of fireproof material throughout. This undoubtedly prevented a much more serious conflagration, which would have involved the station itself; and Islington would probably have been in darkness for several weeks instead of for a few hours. Fortunately the station lighting was not interrupted, owing to a battery being used for this purpose, the leads from which are fireproof throughout their entire length." Commenting on the disaster, our contemporary says: "Even when the electricity works of the Islington Borough Council were built, seven years ago, it could not have been considered good design to bunch together a number of india-rubber insulated feeders and other cables at the back of a high-pressure switchboard. But to leave such an arrangement still standing in 1902 in a generating station responsible for the whole public and private electric lighting of a large Metropolitan borough, is inexcusable. It was this neglect, however, that led to the fire and 24 hours' interruption of supply at Islington."

LABOUR TROUBLES ON THE CONTINENT.

Florence in Darkness—Lighting of Spanish Towns Threatened.

A terrible change has come over the fair face of the city of Florence; and to-day it exemplifies the tremendous issues that can spring from insignificant causes. Because a foundry dismissed a few men, the whole city has been almost suddenly brought to a standstill, through nearly 15,000 men (some accounts put the number higher) throwing themselves out of work; and every hour brings its additions to the idlers. The gas workers have come out with the other sections of labour; and on Sunday the city was in semi or total darkness. Notwithstanding that close upon 6000 troops are in the place (some being located at the gas-works), they are unequal to preventing malicious damage to property, for telegrams on Sunday night announced that the gas-pipes had been cut. It is evident, however, that the struggle has to a large extent been imposed on honest workmen by unscrupulous agitators and socialistic Trade Unions. The gas-works are the property of a French Company, of which M. Théo. Vautier is the Managing-Director. This being the case, it may be depended upon that the city will not remain in darkness an hour longer than can be avoided.

In Spain, too, there are labour difficulties; and the men at the Barcelona and the Valencia Gas-Works were reported yesterday morning to be out on strike. The works supplying the two towns we believe belong to a French Company; so one cause may account for the simultaneous exodus of the men at the two places. It is said that in Valencia the dispute is taking a threatening turn, and that the authorities there are adopting measures to assure the lighting of the town. If we mistake not, there is a second gas-works in Valencia, and probably these are the property of the local governing body.

INTENSIFIED GAS LIGHTING AT NEWMARKET.

Mr. J. H. Troughton, the energetic Engineer and Secretary of the Newmarket Gas Company, has opened the eyes of the residents in the town to the advantages of intensified gas lighting for the public thoroughfares. In the High Street, 27 lamps have been erected, each of 300 to 330 candle power, in place of smaller incandescent gas-lamps, which, under the contract expiring, gave an aggregate of between 4000 and 5000 candle power. Thus the light is more than double; and the improvement has been effected at no extra cost to the town, as the Gas Company have renewed the contract on exactly the same terms as before. The great development of incandescent gas lighting has enabled them to give the town a light which not long ago would hardly have been dreamt of, for it is only a few years since the High Street was lighted by 27 small lamps, with flat-flame burners, each giving from 12 to 15 candle power—an aggregate of only 400-candle power, as compared with about 9000-candle power with the burners just installed. The lanterns are cylindrical in shape, of the shadowless type, with reflectors, giving the best distributive results possible; and as they are placed at short distances apart, there are comparatively no dark shadows between them. Having regard to the re-arrangement of the positions of the lamps which the District Council had carried out, it is locally considered that Newmarket may claim that its High Street is one of the best lighted thoroughfares in the Provinces. At all events, if not the best, it will be hard to beat, especially if expense is taken into consideration. The initial cost of the new installation has been considerable; but the Gas Company feel assurred that their enterprise will be the means of proving to the public that gas can hold its own as the light of the present, with a good chance of having a fair

share of the lighting of the future by means of the incandescent gas-burner. According to the contract which the District Council have just entered into with the Company, additional lamps of the self-intensified kind may be extended in the district at a cost of £6 5s. each per annum, or three for the cost of an electric arc lamp; and although the gas-lamps are of 300 nominal candle power each, the Company assert that there is little difference, if any, in their light-giving capacity when compared with electric arc lamps, for which a much higher nominal candle power is claimed. At any rate, they are content to let the public judge for themselves.

CAERPHILLY WATER SUPPLY.

District Council give way to the Water Company.

A local correspondent sends the following account of the recent settlement of a long-standing difficulty in connection with the water supply of Caerphilly.

For seven years the long-suffering ratepayers of Caerphilly have struggled to have an efficient water supply under their own direct control; but last week their representatives were reluctantly compelled to admit that they had failed in their object. Caerphilly is an important town some seven miles out of Cardiff. Its area for municipal work extends over a coal-producing district, and is of considerable magnitude. The Rhymney and Aber Valleys Gas and Water Company supply water to several of the more populous villages; but a section of the ratepayers in Caerphilly town have resolutely set their faces against the modern administration of a water undertaking, and have buoyed up their short-sighted representatives with the statement that they are quite able to supply the needs of the district. Increasing population soon revealed the fact that the prehistoric storage-tanks of the Council were hopelessly deficient. People occupied new houses without a water supply. Their main drains became elongated depositories of the sewage for want of water to flush them. Stand-pipes were erected in new streets, and the hitherto thrifty housewife soon became a careless gossiper in consequence of the time she had to wait to take her turn to fill her receptacle. The cries of the more modern man were useless; and for upwards of eight years the members of the District Council plodded along in their vain-glory that all would come right in the end. The climax was reached on the 26th ult., when, by a vote of six to three, the Council decided to accept the terms of the Gas and Water Company to take over the supply of the town.

The subject was opened by the Clerk (Mr. W. Spickett) reading a letter received from Mr. A. P. James, the Secretary of the Company, stating that the terms upon which the Directors were prepared to take over the water supply of the town were these: (1) The Company to construct a service reservoir with a capacity of 2½ million gallons. (2) On the signing of an agreement by a contractor to build the reservoir, the Company would take over and pay the District Council £2500 as the purchase-money. (3) The Company were prepared to lay down additional mains, &c., to those houses now not receiving a proper supply.

The Chairman of the Committee who have been conducting the negotiations on the water question (Mr. W. Thomas) remarked that the terms offered were not quite what they had expected; but the Committee could not see any chance of obtaining better. Handing over their water rights was a serious matter; and he suggested that it would not be an unreasonable request that the Council should convene a public meeting, as it was possible that among the ratepayers someone could suggest an alternative scheme for supplying the town, and thus save the transference to a private Company of the people's water rights. If the Council would not call a meeting, he asked them to meet again before finally disposing of the works. He moved that a public meeting be held. Mr. E. W. M. Corbett said the ratepayers who took an interest in the water question were tired of the whole thing. The Council had been looking forward for a long time for something to turn up, and it had not. He therefore moved, as an amendment, that the terms be accepted. Mr. J. Powell said this question had been hanging about for seven or eight years, and the Council had now become a laughing-stock to the outside people. The inhabitants wanted water for domestic purposes and for flushing the sewers. As they could not provide it themselves, why not hand the work over to the Company. They had nothing to do but to accept the terms. Mr. L. P. Charles opposed the motion to consult the ratepayers, as the Council had foolishly listened too long to a section of them. The local Chamber of Trade, as the representatives of the people, had consented to the terms at a special meeting; and why go further? As mentioned above, on a vote, the terms were accepted.

ROYAL INSTITUTE OF PUBLIC HEALTH.

Water and Sanitary Questions—Proposed Minister of Health.

At the recent Congress, in Exeter, of the Royal Institute of Public Health, various papers were read in which the above questions were dealt with. The principal points in those of most general interest to our readers are given below.

Relation of Typhoid Fever to Water Supply.

In the Section of Engineering and Architecture, over which Mr. E. G. Mawbey, M.Inst.C.E., the Borough Engineer of Leicester, presided, Mr. T. Caink, Assoc.M.Inst.C.E., City Engineer of Worcester, read a paper on the above subject. He began by remarking that

GAS AND WATER COMPANIES' STOCK AND SHARE LIST.

Referred to on p. 615.

Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.	GAS COMPANIES.			£ s. d.
590,000	10	Apl. 11	10½	Alliance & Dublin 10 p.c.	18½—19½	..	5 7 8
100,000	10	,,	7½	Do. 7 p.c.	13—14	..	5 7 2
300,000	100	July 1	5	Australian 5 p.c. Deb. .	100—102	..	4 18 0
200,000	5	May 14	6½	Bombay, Ltd. . . .	5—6½	..	5 0 0
40,000	5	,,	6½	Do. New, £4 paid	4¼—4⅝	..	5 9 5
380,000	Stk.	Aug. 14	12	Brentford Consolidated	249—254	−1	4 14 6
270,000	,,	,,	9	Do. New . . .	184—189	..	4 15 3
50,000	,,	,,	5	Do. 5 p.c. Pref. .	125—130	..	3 16 11
206,250	..	June 17	4	Do. 4 p.c. Deb. .	111—114	..	3 10 2
220,000	Stk.	Mar. 13	10¾†	Brighton & Hove Orig.	212—217	+7	4 19 1
246,320	,,	,,	7¾†	Do. A. Ord. Stk. .	155—160	+7	4 16 11
460,000	20	Apl. 11	10	British.	39—41	..	4 17 7
50,000	10	Aug. 14	12	Bromley, Ord. 10 p.c. .	22—24	..	5 0 0
82,850	10	,,	9	Do. 7 p.c. . . .	18—20	..	4 10 0
500,000	10	May 14	7	Buenos Ayres (New) Ltd.	10—11	..	6 7 3
250,000	Stk.	June 24	4	Do. 4 p.c. Deb.	94—96	..	4 3 4
150,000	20	July 11	8½	Cagliari, Ltd. . . .	21—23	..	7 3 6
100,000	10	June 12	10	Cape Town & Dis., Ltd.	15—16	..	6 5 0
50,000	50	May 2	6	Do. 6 p.c. 1st Mort.	54—56	..	5 7 2
550,000	Stk.	Apl. 11	12½†	Commercial Old Stock	267—272	..	4 11 11
251,875	,,	,,	9½†	Do. New do. .	205—210	..	4 10 6
271,875	,,	June 12	4½	Do. 4½ p.c. Deb.	130—134	..	3 7 2
800,000	Stk.	May 28	9	Continental Union, Ltd.	138—143	..	6 5 10
200,000	,,	,,	7	Do. 7 p.c. Pref.	147—152	..	4 12 1
575,000	Stk.	Aug. 28	5½	Crystal Palace Ord. 5 p.c.	118—123*	+¾	4 6 8
60,000	,,	,,	5	Do. 5 p.c. Pref. .	120—125*	+½	4 0 0
106,158	,,	July 11	5	Do. 5 p.c. Deb. Stk.	139—142	..	3 10 5
486,090	10	July 30	10½	European, Ltd. . . .	18—19	..	5 10 6
354,060	10	,,	10½	Do. £7 10s. paid	13½—14½	..	5 8 8
15,243,200	Stk.	Aug. 14	4	Gas-light and Coke — 4 p.c. Ord. . .	90—92	..	4 7 0
2,600,000	,,	,,	3½	Gas-light and Coke — 3½ p.c. max. .	88—90	..	3 17 9
3,799,735	,,	,,	4	Gas-light and Coke — 4 p.c. Con. Pref.	109—111	..	3 12 1
4,193,975	,,	June 12	3	Gas-light and Coke — 3 p.c. Con. Deb.	93—95	..	3 3 2
70,000	10	Nov. 13	8	Hongkong & China, Ltd.	13⅜—14⅜	+⅛	5 10 4
3,800,000	Stk.	May 14	10	Imperial Continental .	204—207	..	4 16 7
473,600	Stk.	Aug. 14	3½	Do. 3½ p.c. Deb. Red.	98—100	..	3 10 0
561,000	Stk.	Aug. 28	10	Liverpool United A	218—220*	+3	4 10 11
718,100	,,	,,	7	Do. do. B .	164—166*	+3½	4 4 4
306,083	,,	June 24	4	Do. do. Deb. Stk.	116—118	..	3 7 10
75,000	5	June 12	5	Malta & Medn., Ltd. .	4¼—4⅜	..	5 5 3
560,000	100	Apl. 1	5	Met. of Melbourne — 5 p.c. Deb.	106—110	..	4 10 11
250,000	100	,,	4½	Met. of Melbourne — 4½ p.c. Deb.	103—105	..	4 5 9
541,920	20	June 12	3½	Monte Video, Ltd. . .	9—10	..	7 0 0
1,515,892	Stk.	Aug. 8	4½	Newc'tle & G'tesh'd Con.	103—104	..	4 6 7
346,855	Stk.	July 4	3⅜	Do. 3⅜ p.c. Deb.	98—100	..	3 10 0
150,000	5	May 28	8	Oriental, Ltd. . . .	7—7½	..	5 6 8
135,000	4½	,,	8	Do.	6¼—6⅝	..	5 6 8
15,000	1	,,	8	Do.	1⅜—1⅝	..	4 11 5
					* Ex div.		

Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.	GAS COMPANIES.			£ s. d.
60,000	5	Mar. 13	7	Ottoman, Ltd. . .	6⅛—6⅜	..	5 3 8
851,070	10	Apl. 25	7	River Plate Ord. . .	10—10½	..	6 13 4
300,000	Stk.	June 24	4	Do. 4 p.c. Deb. .	93—96	..	4 3 4
250,000	10	Mar. 26	8	San Paulo, Ltd. . . .	12—13	..	6 3 1
135,000	Stk.	Mar. 13	10	Sheffield A	239—241	..	4 3 0
209,984	,,	,,	10	Do. B	238—240	..	4 3 4
523,498	,,	,,	10	Do. C	237—239	..	4 3 8
6,000,000	Stk.	Aug. 14	5⅓	South Met., 4 p.c. Ord.	123—126	..	4 4 7
1,700,000	,,	July 11	3	Do. 3 p.c. Deb. . .	92—94	..	3 3 10
380,940	Stk.	May 14	5	Southampton Ord. . .	102—106	..	4 14 4
87,930	,,	July 11	4	Do. 4 p.c. Deb.	102—105	..	3 16 2
120,000	Stk.	Aug. 28	6	Tottenham and Edmonton — A. 5 p.c.	118—123*	+1	4 17 7
302,520	,,	,,	4⅓	Tottenham and Edmonton — B. 3½ p.c.	93—98*	+½	4 11 10
182,380	10	Jan. 16	5	Tuscan, Ltd.	7—8	..	6 5 0
149,900	10	July 1	5	Do. 5 p.c. Deb. Red.	95—98	..	5 2 0
230,000	5	Aug. 14	9½	West Ham, 10 p.c. . .	10—11	..	4 6 4
172,000	10	,,	6½	Do. 7 p.c. . .	13½—14½	+½	4 9 8
				WATER COMPANIES.			
780,599	Stk.	June 24	11⅓	Chelsea, Ord. . .	300—310	..	3 14 2
150,000	,,	,,	5	Do. 5 p.c. Pref. .	152—157	..	3 3 8
160,000	,,	,,	4⅓	Do. 4½ p.c. Pref. '75	140—143	..	3 2 11
175,785	,,	Mar. 26	4⅓	Do. 4½ p.c. Deb. .	140—145	..	3 2 1
1,720,560	Stk.	Mar. 26	8	East London, Ord.. .	215—220	..	3 12 9
654,740	,,	June 12	4⅓	Do. 4½ p.c. Deb. .	142—147	..	3 1 3
1,018,046	,,	,,	3	Do. 3 p.c. Deb. .	97—99	+1	3 0 7
700,000	50		8	Grand Junction — 10 p.c. max..	110—115	−2	3 9 7
310,000	Stk.	Mar. 26	4	Grand Junction — 4 p.c. Deb..	127—130	..	3 1 7
708,000	Stk.	Aug. 14	14	Kent	285—295	..	4 14 11
160,000	,,	,,	7	Do. New, 7 p.c. max..	195—205	..	3 8 4
1,043,800	100	June 24	11	Lambeth, 10 p.c. max..	290—300	..	3 13 4
406,200	100	,,	8½	Do. 7½ p.c. max..	210—220	..	3 17 3
350,000	Stk.	Mar. 26	4	Do. 4 p.c. Deb..	125—130	..	3 1 7
500,000	100	Aug. 14	12 5/10	New River, New Shares	390—400	..	3 4 0
1,000,000	Stk.	July 30	4	Do. 4 p.c. Deb..	125—130	..	3 1 7
902,300	Stk.	June 12	7	South-wark and Vauxhall — Ord. . . .	192—197	..	3 11 1
126,500	100	,,	7	South-wark and Vauxhall — 7½ p.c. max.	180—185	..	3 15 8
489,200	Stk.	,,	5	South-wark and Vauxhall — 5 p.c. Pref. .	152—157	..	3 3 8
1,019,585	,,	Apl. 11	4	Vauxhall — 4 p.c. A Deb.	125—130	..	3 1 7
1,155,066	Stk.	June 12	10	West Middlesex. . .	275—285	..	3 10 2
200,000	,,	,,	4⅓	Do. 4½ p.c. Deb. .	139—144	..	3 2 6
200,000	,,	Mar. 13	3	Do. 3 p.c. Deb. .	96—98	..	3 1 3
					* Ex div.		

† Next dividend will be at this rate.

it had been said that the typhoid case-rate of any town was a fair index of the hygienic quality of its water supply; and his experience and investigations had convinced him that the proposition expressed a general truth. It did not necessarily imply that water was the only vehicle of transmitting the organisms which give rise to typhoid fever; but it did imply that the number of cases of typhoid proceeding from all other causes was small compared with that for which the water supply is responsible. It was not impossible by careful consideration of the incidence of typhoid in the various towns throughout the country to determine approximately the average case-rate which might be expected from all causes other than the public water supply. Taking Worcester as an example, for some years prior to 1894 the city suffered from a much greater number of typhoid cases and deaths annually than the average of similar towns throughout the country. The water supply had from time immemorial been derived from the River Severn, which also served as the conduit for the drainage of towns and villages along its banks. Until 1899, Shrewsbury discharged the whole of its sewage in a crude state into the river; while the Stour, which is still considerably polluted with sewage and manufacturers' waste, discharges into the Severn some 16 miles above the intake of the Worcester Water-Works. These works were built in 1857, and enlarged in 1867; no further extension being made until 1894. Prior to 1894, the numerous typhoid cases occurring annually in the city engaged the anxious attention of the Corporation. The question of abandoning the Severn as a source of supply was seriously discussed by the City Council; artesian wells being proposed as a substitute. On the ground of expense, however, the Council decided to make the best of the works they already possessed, and to materially increase the area of the filter-beds. The works were completed in the spring of 1894. In June of the following year, in the report upon the results of the fltering area, the author observed:

> There is probably not on record a more striking instance of the beneficial effect of an improvement in a public water supply than in the extraordinary reduction of typhoid in the city which has followed the extensions referred to. The number of cases which for the winter half of the four years ending March, 1894, averaged 52, fell in the corresponding half year ending March, 1895, to six.

Down to 1894, the average typhoid case-rate had been about 150 per 100,000 per annum. From the beginning of 1895 to the end of 1901, the average case-rate had been 37. Further observations led him to the conclusion that there was a direct connection between the typhoid incidence and the variations in the flow of the river. After the autumnal rise of the river in September, 1892, the number of cases mounted up with great rapidity, which continued more or less until March, 1893—dropping after a fall in the river, and again rising after a swell. After the extension of 1894, however, the relations between the rise and fall of the river and the typhoid, with perhaps the single exception of the last quarter of 1899, completely disappeared. This fact satisfied him that it was unnecessary to construct large storage reservoirs in order to avoid taking water from the river during the first week or so of the flood. His observations had convinced him that incomparably superior hygienic results could be secured for a given expenditure by sand filtration alone than by the construction of reservoirs, whether for the purpose of subsidence or to avoid taking water from the river when in flood. He had compared the typhoid incidence of Worcester, after the extension of the filters, with that of some other towns, particularly those deriving their water supply from deep wells in the new red sandstone formation. The results were somewhat startling. The average case-rate over the ten years ending 1901 of three towns deriving their water from deep wells regarded as unimpeachable was 149 per 100,000; while in three towns supplied with filtered water the cases averaged 77, and of three towns supplied from upland sources the average was 133 per 100,000 per annum. A comparison of the deep-well supply of Birkenhead with the supply of Liverpool, which is mainly from upland sources, showed further that from the beginning of 1892 until October, 1895, the curves of typhoid maintained a striking resemblance. During that period, about 30 per cent. of the water supply of Liverpool was obtained from the sandstone wells. From 1895, the quantity of well water in the Liverpool supply was largely reduced; and whereas from the beginning of 1892 to October, 1893, the typhoid case-rate averaged 227 per 100,000 per annum, as compared with the average of 174 at Birkenhead, from the beginning of 1898 onwards, when the proportion of well water was only 13 per cent., the case-rate averaged 132; Birkenhead being at the same period 192. Pursuing his investigations, he collected statistics of the enteric incidence for the five years ending 1899 of all the towns with populations exceeding 10,000, whose health returns appear in the annual reports of the Local Government Board, and classified them under their respective sources of water supply. The annual case-rate for each group came out as follows: (1) Towns supplied from wells sunk in the new red sandstone, 117 per 100,000; (2) from wells sunk in the chalk, 109; (3) from upland sources, 119; (4) from mixed sources, 91; and (5) from rivers, 82. Further observation pointed to the conclusion that, as regarded the towns supplied from rivers, the typhoid case-rate depended largely upon whether or not they possessed adequate provision for efficient filtration. This was certainly the case with respect to one of the towns in the group—namely, the city of Exeter. In that city the works for improving the water-works, which included an addition of 100 per cent. to the filtering area, were completed about the beginning of 1901. The result upon the enteric case-rate for the second half of last year was as remarkable as it was gratifying. The number of cases which during the latter half of the three years preceding 1901 averaged 70, fell in 1901 to 15. The record so far for the present year promised a still further improvement. It was as difficult to resist the conclusion that the public water supply was the origin of the typhoid in Exeter, as it was to escape the conviction that its reduction was due to the improvement in the filtration. He was conscious of the responsibility incurred in attributing almost universally to the water supplies the typhoid incidence, not only of this country, but of many others. In a matter involving a large collection of statistics and computations, he was

aware that errors might have crept into his figures; but he had done his best to avoid them, and believed the facts he had submitted were substantially correct.

Torquay and its Water-Works.

Mr. W. Ingham, Assoc.M.Inst.C.E., Water Engineer to the Torquay Corporation, read, in the same section, a paper on the above subject, in which he described a typical case of designing a water-works to supply a population of 50,000. First, as to the storage reservoir, he said masonry dams were, to some extent, luxuries; and in the case he was describing a concrete wall was substituted in the trench—being stopped just under the ground-line, and opened out to receive the puddle for the top of the embankment. This was a point on which English and American engineers differed. The former did not approve of a wall in an embankment above ground, as it was so liable to be broken owing to unequal pressure during the time the earth was settling. But a large number of examples with a centre wall of masonry had been built in America, and proved to be satisfactory. The author, however, having found good puddle a reliable material, preferred to use it in embankments above ground. There was no necessity for making the thickness of puddle walls more than one-fourth or one-fifth the depth where good blue clay puddle could be obtained. The overflow weir required special attention, as on this depended the safety of the embankment. Some engineers allowed 3 feet of weir per 100 acres of gathering-ground; but this, like all other empirical formulæ, did not cover all cases. A much better rule was to so design the weir that with a maximum flood the water should not exceed 2 feet in depth over the lip. Insufficient length of weir had led to several failures in embankments, and the author pointed to the Johnstone disaster in America as a case in point. Plymouth had 125 feet of weir for 5365 acres (1 foot for every 43 acres); and the highest flood since the reservoir was completed had been about 2 feet. Torquay had 30 feet for 1200 acres (1 foot for 40 acres), and as far as the author was aware, the greatest flood had not exceeded 12 inches. He favoured circular service reservoirs, where the land could be obtained cheaply. If the water required filtering, it would probably be cheaper both in first cost and afterwards in maintenance if the beds were constructed in the neighbourhood of the service reservoirs, The pipe-line should be of sufficient size to discharge at least 50 per cent. more than the maximum daily consumption; and a meter should be fixed at the head of the trunk main to measure all water flowing into the town. A point which required attention in designing a pipe-line was the question of rusting. In his own district, the pipes had to be scraped annually, and the delivery was increased from 20 to 28 per cent. after scraping. The total cost of the scheme he had outlined would be, including contingencies, £150,800, or £3 per head of the population.

Municipal and Parliamentary Hygiene.

Mr. J. A. Bellamy, the Mayor of Plymouth, and Chairman of the Plymouth Gas Company, presided over the section devoted to the above subject, and delivered the following address:—

Notwithstanding the intense pressure in these days to keep level with the fierce competition in all branches of our every-day work—be it commerce, medicine, or law—there is an ever-increasing desire to make life in our towns more healthful and enjoyable for the poor as well as the rich. The problem ever present, however, is, in the first place, the education of public opinion; and, in the second, that of cost. It is useless to lay down theories that cannot be put into practice because of the burdens they entail on taxpayers and ratepayers. There is a limit to the capacity of those who pay rates and taxes; and if this economic law be defied the result is disaster, and a state of things worse than that already existing. In offering some observations, therefore, upon this subject, my municipal experience over a lengthened period imposes upon me the obligation of bearing one important fact in mind—viz., that sanitary reforms cost money, and to be thoroughly successful the cost must be within the means of those who have to pay.

I take it that "municipal and parliamentary hygiene" means, in a few words, the healthy prolongation of life. The happiness of mankind in civilized communities must first of all depend upon the health of the people. No material prosperity can offer any compensation for the absence of health. Wars waged for commercial advantages—the thousands of lives thereby sacrificed, the millions of money spent, and the woe and misery brought in their train—are all waged in vain if the lives of the majority of the people, on whose behalf the wars are entered upon, are unhealthy lives.

The question before us is: What can we do, by means of the machinery provided by municipalities or by Parliament, to make things better than they are for those who live in towns and cities? I leave village life aside for the moment, not because its claims are non-existent, but because the most urgent problems to be solved are those affecting the dwellers in towns. I think we shall be all agreed that abundance of pure air and water, a perfect drainage system, and personal cleanliness, would practically solve the problem. Of course, "pure air and plenty of it" means the opening out of congested areas, improved dwellings for the poor, isolation of infectious diseases, thorough inspection of thickly-populated districts for prompt removal of house refuse, and thorough cleansing of curtilages, lanes, and streets.

In many towns to-day great progress has been made on these lines; but still much remains to be done. The starting-point with a municipality desirous of doing its duty in this respect should be the appointment of a medical officer, whose whole time should be devoted to the work of his office. I know that there are still many towns with more than 50,000 inhabitants which try to get along with the assistance of a medical officer at a small salary, but who has also his private practice to attend to. In my opinion, this is one of the most wasteful systems of spending the ratepayers' money. It is impossible for any medical man, with a practice worth having, properly to perform the duties of a medical officer for a large town. If he claims that his practice is so insignificant that he can give the necessary time to his duties as a

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TORONTO	250,000
OTTAWA.	250,000
LINDSAY (Remodelled)	125,000
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BELLEVILLE	250,000
OTTAWA (Second Contract)	250,000
BRANTFORD (Remodelled)	200,000
ST. CATHERINES (Remodelled)	250,000
KINGSTON, PA.	125,000
PETERBOROUGH, ONT.	250,000
WILKESBARRE, PA.	750,000
ST. CATHERINES (Second Contract)	250,000
BUFFALO, N.Y.	2,000,000
WINNIPEG, MAN.	500,000
COLCHESTER (Second Contract)	300,000

	Cubic Feet Daily.
YORK	750,000
ROCHESTER	500,000
KINGSTON, ONT.	300,000
CRYSTAL PALACE DISTRICT	2,000,000
DULUTH, MINN.	300,000
CATERHAM	150,000
LEICESTER	2,000,000
ENSCHEDE (HOLLAND)	150,000
BUENOS AYRES (RIVER PLATE CO.)	700,000
BURNLEY	1,500,000
KINGSTON-ON-THAMES	1,750,000
ACCRINGTON	500,000
TONBRIDGE	300,000
STRETFORD	500,000
OLDBURY	300,000
TODMORDEN	500,000
SALTLEY, BIRMINGHAM (Third Contract)	2,000,000
YORK (Second Contract)	750,000
ROCHESTER (Second Contract)	500,000
NEWPORT (MON.)	250,000
TOKIO, JAPAN.	1,000,000
PERNAMBUCO (Brazil)	125,000
MALTON	150,000
DULUTH, MINN. (Second Contract)	300,000

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medical officer, I should very much doubt his being worth his salary. A medical officer devoting his whole time to his work must of necessity feel called upon to organize his department, to suggest reforms even if their execution should involve more labour for himself. His professional future is at stake; and from what has come to my knowledge, there is an intense desire with most medical officers to improve the health of the towns where their services are given, altogether irrespective of the time and labour this may involve to themselves. The private medical man with a practice of any value must perforce devote his time and thought first of all to his private patients and the balance to the municipality retaining a portion of his time. Can he be expected under these circumstances to initiate reforms increasing his municipal work and lessening his power to make an income by his private practice? I therefore emphasize the overwhelming importance of having medical officers exclusively retained by all municipalities anxious to improve the health of their inhabitants. Apart from other considerations, the officer provides the best machinery for solving the problem of supplying pure air to those who dwell in towns.

Proposed Minister of Public Health.

Dr. T. Poyntz-Wright, of St. Neots (Liskeard), read a paper on "The Desirability of Appointing a Minister of Public Health." He remarked that while county medical officers occupied a position of independence, the local health officer was the servant of the district council, and in himself was absolutely powerless. In the majority of cases the nature of the appointment was most unsatisfactory. The election of the local health officer for one year only placed him in a false and anomalous condition; while in many instances the salaries were most inadequate. In rural districts, the appointment of sanitary inspector was often associated with that of relieving officer or surveyor. But the duties of these different posts differed widely in their nature; and a man who was conversant with one set was usually ignorant of the others. With regard to medical officers of health, the following conditions should be made compulsory: Absolute permanent tenure of office, the officials being removable only by the Local Government Board; medical officers should devote the whole of their time to their official duties, adequate salaries being paid to them; and the sanitary areas of the country should be abolished. In addition, a sanitary inspector should hold a science certificate, and both classes of officers should be entitled to superannuation. Apart from the officers, there were many other improvements that might be introduced into the public health service. The existing deficiencies could best be remedied by the appointment of a Minister of Public Health. At the time of the passing of the Public Health Act in 1875, sanitation and the public health service were in their infancy. Now, however, the service had become a gigantic organization, and the public health work of the Local Government Board had increased to such an extent that it should be handed over to a separate department, with a Minister of Public Health at its head. He moved—"That, in the interests of the public, the health services of this country require organization on a system suitable to modern conditions, and that this end would be furthered by the powers and influence for initiative of the Health Department of the Local Government Board being increased, and the department formed into a Ministry of Public Health." The motion was carried.

Registration of Plumbers.

Mr. W. J. Addiscott (Plymouth) read a paper on this subject, the importance of which was, he said, his plea for asking the Institute to reaffirm the opinion expressed in 1900 favouring the principle for the registration of plumbers. This movement had received the hearty co-operation of the British Medical Association, representing upwards of 17,000 members, who had petitioned Parliament in its support. Other representative bodies throughout the United Kingdom, including a conference of Health and Water Authorities held at Birmingham in 1900, had also approved of registration for plumbers. Last session an enabling Bill was passed by the House of Lords and read a first time in the Commons. Owing, however, to the growing difficulty of private members' Bills being passed, it had to be dropped, with many others, for the session. The object of this Bill was to give the Local Government Board instructions to frame a scheme that should be acceptable to all parties. Without attacking any existing interest which had for its object the improvement of the public health, it in no way interfered with the liberty of the subject. It did not prevent any person acting or setting himself up as a plumber; but it did seek to prevent any person foisting himself on the public as being registered when he was not. All persons applying for registration must give satisfactory evidence of capability to supervise or carry out sanitary work before being granted registration; thus furnishing a safeguard to health, and giving the public opportunity to engage good workmen, if they so desired, to carry out the sanitary plumbing in their homes. Increased interest was shown by corporations and other public bodies in this question, by their demanding that only registered plumbers should be engaged as inspectors of water-fittings and in similar positions. In order to raise the tone of the workman, the Worshipful Company of Plumbers in London, in conjunction with others, had formed a "Plumbers' Apprenticeship Board," and had issued a form of indenture—which embodied provisions whereby the master must allow his apprentice to attend a trade class, if one was held in the neighbourhood, and the apprentice, on the other hand, was equally bound to attend such class. At the end of each year, the lad, after the first year, must submit himself to an examination in the theory and practice of plumbing, in order to note the progress made. He was pleased to say that this form of indenture was being extensively used by masters in the trade. The Worshipful Company of Plumbers were promoting the Registration of Plumbers Bill in Parliament. This Bill would afford additional safeguards to the public health by giving local authorities extended powers in supervising plumbers' work, revoking the certificates of any who were found wilfully doing bad work or violating the conditions under which the certificates had been granted, and without increasing the number of officials or adding to the expense

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of the community. He concluded by moving—"That this Congress of the Royal Institute of Public Health, held at Exeter, approves of the efforts made by the Worshipful Company of Plumbers in promoting the Registration of Plumbers Bill, believing that such a measure will be for the safeguarding of the public health and beneficial to all classes of the community." The motion was carried.

PROPOSED NATIONAL WATER BOARD.

In the course of the proceedings, the following resolution was passed: "That the Royal Institute of Public Health be asked to co-operate with the British Association of Water-Works Engineers in drawing the attention of the Government to the urgent neccessity, in the best interests of public health, for the formation of a National Water Board."

EXPLOSIONS OF GAS.

Last Wednesday, a gas explosion occurred at No. 20, Frensham Street, Peckham, upon the premises of Messrs. Gatti and Stevenson, Limited, ice merchants. The office on the ground floor was blown out, and the building was set on fire. The place was badly damaged, and an assistant named Josef Ruffe was burnt on the face, head, and hands. A gas explosion, fortunately unattended with personal injury, occurred at the establishment of Messrs. Stidston, drapers, Old Town Street, Plymouth, last week. About 12.30 a loud report was heard in the shop, and on Mr. R. S. Stidston and others proceeding to the top of the premises, they found the kitchen in great disorder, and the large gas cooking-stove practically wrecked, One of the cooks, named Gribble, was found lying on the landing in an unconscious condition. Medical aid was summoned, but it was found that she had received nothing more than a severe shock. The stove in which the explosion took place contains two very large ovens, one of them being utilized for cooking and the other for warming the dishes. At the time of the explosion, the dinner was ready for serving, and the cook was approaching the oven for the purpose of removing the meat and vegetables, when the explosion took place. The door of the oven was forced open, and Miss Gribble was blown through the open doorway on to the landing, quite 10 feet away. The side and back of the stove were completely blown out, while all the saucepans which were on the top at the time were smashed to pieces, as well as a large quantity of crockery. The explosion is accounted for in this way: It is thought that the door of the oven containing the vegetables and dishes was shut rather hard, extinguishing the gas-jet on the left-hand side. The right-hand jet in the same oven was still alight, and the escaped gas coming in contact with it caused the explosion.

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

Reverting to the Greenock Corporation gas accounts, I take note of the remark by Mr. Morison, in presenting the accounts, that he frankly admitted that Mr. Ewing, the Gas Manager, had taken more gas out of the coal than he had promised. This is a statement which is welcome, as coming from a gentleman in Mr. Morison's position. It also leads me to look into the matter of the yield of gas, which is of some importantce, in view of events in Greenock during the year. I find that the estimated yield for the past twelve months was 9600 cubic feet per ton, which was 352 feet more than was derived during the preceding year. Instead of the expected quantity, however, the yield was at the rate of 10,015 cubic feet per ton, which was 767 feet above the yield the preceding year, and 415 feet above the estimate. But during the first ten months of the last year, the yield was 10,215 cubic feet per ton, which was about 1000 feet more than the yield in the preceding year. There must have been something, then, in the other two months which brought down the average. Mr. Ewing finds this to be in the working of an incomplete installation of machine stoking. That is a subject upon which there is a difference of opinion at Greenock, and upon which divergent views may be expected to continue. It is clearly one which cannot be determined, in anyone's mind, without having due regard to local circumstances, and in the case of Greenock, it is to be borne in mind that the gas-works are in a half-and-half condition—part mechanical and part hand stoking. In such a state of matters, it is a necessity that the hand stoking should have the benefit, because, the whole works being under hand labour, the organization would be more complete than when half was mechanically stoked. But I have a feeling that the condition of the works ought not to account for such a large difference as is here shown. It is startling to think that, in a yield of over 300 million cubic feet—upon the working of 31,000 tons of coal—two months with mechanical stoking should lead to a reduction in the yield of 200 cubic feet of gas per ton of coal all the year round. This is a result which should not be passed by without consideration. We know that machine stoking is not profitably applicable in small works. What is the limit of smallness where they become unprofitable? The question is one which can only be settled by means of experiment on a practical scale. We have here such an experiment, and one which is of some moment—being the first in this part of the country where it has been brought out that hand stoking is more profitable than machine stoking. It may be that there is a personal element in the very forefront of the question here, because it is not to be overlooked that last year Mr. Ewing, with 1218 tons of coal less, produced 12,350,000 cubic feet of gas more than was produced in the preceding year. It is therefore evident that the capacity of the Manager must be taken into account as well as the condition of the works.

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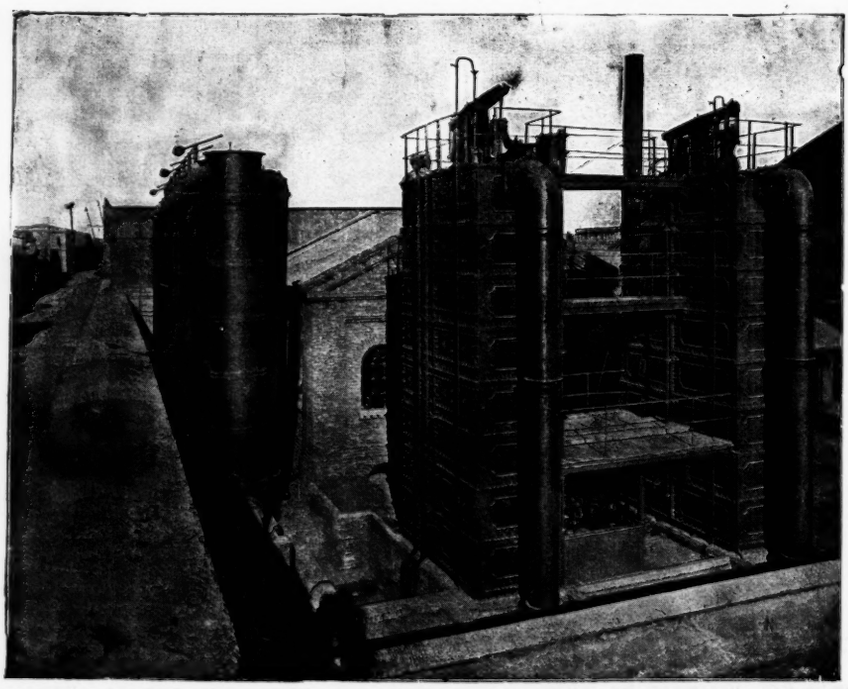

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The condition of the works turns attention to the agitation which has been in existence for some time over the condition of one of the gasholders. I am not aware who made the discovery that the holder required to be repaired; but, whoever it was, it is evident that the word of the Manager was not considered by his party to be sufficient when he said that a trifling repair was all that was necessary. Once the position was reached that the Manager was not sufficiently capable to advise them, it was not difficult to get on to the next stage, that a sum of over £2000 would require to be expended in putting the holder into a safe condition. Then, however, the magnitude of the sum seems to have frightened the Council; and reference has been made to Mr. Thomas Wilson, of Coatbridge, to report upon the matter, from a neutral point of view. Mr. Wilson will doubtless put the affair on a satisfactory footing—that is, if the Corporation follow his advice—and the Manager may turn out to have been right all along.

Another point as to the condition of the Greenock Gas-Works is not to be lost sight of when memory goes back to the year before last, and it is remembered that the Convener of the Gas Committee was able to convince his colleagues that a marine boiler was the most appropriate for use in a gas-works. He got his way; and now it is found that the boiler is both small and inefficient. Last year it consumed about 5000 tons of good coke, which was a heavy loss to the undertaking. Now, I understand, the furnace has been adapted, at a small outlay, for the use of breeze; and, though the boiler may not be equal to the duty which ought to be got out of it, there will be a great saving in the cost of the fuel required to serve it. There is, in this and the preceding paragraph, the lesson for all, in the boldest of characters—that, in matters technical, the Manager should have his way; the function of the members of the Corporation being to look after the capital and revenue accounts. But for the interference of the Corporation in these matters, I understand, the balance upon last year's working in Greenock would have been £3000 more than it was. If this could be brought home generally, it would clearly be to the profit of gas managers.

The Aberdeen gas accounts for the past year have been published this week, and have not excited comment. This may be taken to be because of their satisfactory nature and the level-headedness of the population. The works have been so long successfully conducted, that no one ever looks for anything else than a favourable report at the end of each successive year. Mr. A. Smith is one of the most far-seeing of gas managers. He has had the works so long in his hands that he has had time to develop his policy of management; whereas many others are scarcely past the stage of initiating theirs. As the outcome of his policy, we find to-day works which are as up-to-date as any in Scotland, more substantial than most, and giving a yield of over 10,000 cubic feet of gas per ton of coal carbonized. But the yearly outcome of the business has not been his only care; for we find the mortgage debt has been reduced by £52,251, leaving only £84,765 to be dealt with, while the work of redeeming annuities has been going on so steadily that about one-third of them have been wiped out of existence. Of 26,000 annuities, only 17,601 remain. But the handling of the capital account is merely the providing of the means. The end is to be found in the results of the working of the undertaking. During the past year, the work which was put through was the largest ever experienced in Aberdeen. The output of gas—627 million cubic feet—was the highest on record, which is, of course, to be accounted for primarily, by the marvellously rapid growth of the city; but the low price at which gas was supplied (3s. 2d. per 1000 cubic feet) had also a great deal to do with the volume of business. The wonder is how, with coal at 18s. 11d. per ton, it was possible to sell gas at so low a price. One of the most gratifying features in the accounts is the small quantity of gas which is unaccounted for, as well as the downward trend of that always disappointing element in gas supply. It is now only 5·79 per cent., against 7·13 per cent. at the beginning of the year. The income from the sale of gas amounted to £93,701, and from residuals to £16,856. Look where we will, there is nothing to be seen but prosperity—a success which is not accidental but is commanded, in the fullest sense of the word, as well as deserved.

A preliminary announcement is made with reference to the accounts of the Arbroath Gas Department for the past year, to the effect that they "are in a somewhat unhealthy condition, notwithstanding the fact that this year the coal contracts have been effected on a cheaper basis than last year." It is added that "the backwardness in the accounts is understood not to be in connection with the improvements at the works recently sanctioned by the Corporation, but is, it appears, the outcome of the shortage of coal discovered last year."

Mr. Charles Hawksley has forwarded to the Town Clerk of Aberdeen his report upon the question of the most suitable source from which to obtain an additional supply of water for the city. The Town Council have been favourably impressed with a suggestion thrown out locally, that the new supply should be taken from the River Avon, which is a tributary of the River Spey. There are no engineering difficulties in the way of such a scheme; and the water would be the purest supply of surface-gathered water in the United Kingdom. The terms of Mr. Hawksley's report have not been made public; but it is intimated that he is strongly against the Avon scheme, and suggests the taking of the water from the River Dee, as at present, but that the intake should be above Ballater—just a little below where the large tributary stream, the Gairn, falls into the river. It is said that Mr. Hawksley proposes to do away entirely with the use of the existing aqueduct. This would mean that his suggestion is to provide a new supply altogether, and not merely an augmentation. It will, however, be difficult to convince the community of Aberdeen that their present water supply should be altogether dispensed with; and this may interfere with the adoption of Mr. Hawksley's report.

Manchester Water Supply.—In an "omnibus" Bill which the Corporation of Manchester intend to promote next session, power will, it is understood, be sought to raise a further sum of £1,000,000 for the extension of the Thirlmere works.

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CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *Aug.* 30.

Sulphate of Ammonia.

The demand has again been active during the week; and the business done has been considerable, in view of the supply usual at this time of the year. It may also be noted, with satisfaction, that the purchases were not entirely monopolized by dealers who had to fill previous sales, but that they were participated in by consumers who had waited for their supplies until the last moment. The transactions have chiefly been concluded at last week's prices; but towards the close the tendency has hardened—values now being £12 to £12 1s. 3d. per ton f.o.b. Hull, £12 3s. 9d. to £12 5s. f.o.b. Leith, and £12 5s. f.o.b. Liverpool. In forward delivery, no business is reported; buyers having been unwilling to concede makers' demands, which are about £11 15s. f.o.b. Leith on ordinary terms for October-March delivery, and £11 15s. Beckton terms.

Nitrate of Soda.

This market is quiet, but steady, at 8s. 4½d. to 8s. 7½d. according to quality. Spring delivery is still quoted at 8s. 9d. per cwt.

LONDON, *Aug.* 30.

Tar Products.

The markets generally remain in the same position; and there is very little change in values. The demand for pitch is strong for prompt delivery, and there are inquiries in the market for January-June next. Several Continental fuel makers, however, are undoubtedly reducing their output; the very high price of pitch proving a serious obstacle to the manufacture of briquettes at a remunerative figure. Carbolic acid remains in the same position, but there is a little better demand for crude; there being a report that the German makers are abandoning the use of the synthetical process. In crystals, 34-35's have been placed at 5d. per pound; and in one instance 5¼d. was paid for a small quantity. Creosote is in good demand, especially in the Yorkshire district, where several contracts have been placed at fairly satisfactory prices. Toluol continues depressed. Business is reported at a very low figure for a small quantity of pure for home consumption. In solvent, small sales have been made at as low as from 7½d. to 8d. This, of course, is principally to clear stocks which had accumulated in several quarters. Higher values are being paid for special qualities; but the demand is limited. A little business has been done in 50-90 per cent. benzol at 7d. per gallon f.o.b. London, prompt shipment. There are certainly inquiries for 90 per cent. all over next year; but distillers do not care to quote so far forward on the basis of the present low price. Anthracene remains in the same position. There is a little business doing, but only in the best qualities of high percentage.

The average values during the week were: Tar, 18s. to 22s. 6d. Pitch, London, 50s. to 52s.; east coast, 48s. to 49s.; west coast, 44s. to 44s. 6d. Benzol, 90 per cent., 7½d. to 8d.; 50-90 per cent., 7d. Toluol, 7½d. to 8d. Crude naphtha, 2½d.; solvent naphtha, 8d.; heavy naphtha, 9d. Creosote, London, 1¾d.; North, 1d. Heavy oils, 1¾d. Carbolic acid, 60 per cent., 1s. 8d. Naphthalene, 30s. to 45s.; salts, 20s. to 21s. 6d. Anthracene, "A," 1½d. to 1¾d.; "B," 1d.

Sulphate of Ammonia.

The market is firmer all round, especially for prompt delivery. The Gaslight and Coke Company ask £12 2s. 6d. for September shipment, and could no doubt realize this for a guaranteed delivery during the first week of next month. For forward delivery, their price still remains £11 15s. October-March; and this price would also be accepted for October-December only. Other London Companies have sold for prompt at £12 2s. 6d. on their own special terms, and are reported as asking £12 5s. In Hull, business has been done at £12 2s. 6d. for early shipment; but consumers will not purchase for forward delivery, though for September £12 1s. 3d. is being offered. In Leith, the demand is fairly good, and supplies appear to be rather short. Business was reported early in the week at £12 2s. 6d. and £12 3s. 9d.; but makers are now quoting £12 5s. for prompt shipment.

COAL TRADE REPORTS.

Lancashire Coal Trade.

The month opens without any really quotable change in prices, but a strong tone all through, and a tendency to harden in some directions. House-fire qualities have perhaps been in rather lessened request during the past week, owing to the spell of much warmer weather; but this has had no effect upon the market. Collieries are mostly too short of stocks to be anxious about pressing any temporary surplus output for sale, and full list rates are being firmly held to on the basis of about 13s. 6d. to 14s. per ton for best Wigan Arley, 12s. to 12s. 6d. for seconds Arley and Pemberton four-feet, and 9s. 6d. to 10s. for common house-fire coals. The position with regard to the lower descriptions of round coal is steadily improving, and, as intimated in previous reports, it is tolerably certain prices have not only touched the minimum, but that there is more than the possibility of some stiffening on current rates. On contracts for locomotive fuel, which had been held over, railway companies have recently had to come in at prices they were declining to pay a month or so back; and much the same applies to gas coals when the settlement of the usual contracts has been deferred in the hope of securing more favourable quotations. The commoner sorts of round coal are reported to be going away in increasing quantity for iron making and other manufacturing purposes, while larger requirements for ordinary house-fire purposes will shortly be coming on the market. The shipping trade is also showing rather more activity. Altogether, collieries are in a stronger position with regard to common

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round coals, and there is comparatively very little on the market offered for special clearance sale at under current rates. For a good average quality of steam and forge coal, it is not difficult to get 8s. 6d. per ton at the pit, and better sorts are quoted at 9s. For shipment, average steam coal is fetching about 9s. 9d. to 10s. per ton at the Mersey ports. Engine fuel is fully maintaining the improvement reported recently. All the better sorts of slack meet with a ready sale, supplies being short if anything, and prices strong at about 6s. 6d. to 7s. per ton at the pit, with sellers in some instances stiffening on these figures where new business is put forward. The lower qualities of slack move off fairly well; but supplies generally are ample. Prices are steady at about 4s. 9d. to 5s. 3d. per ton at the pit for the common or medium sorts. All descriptions of coke which are put upon the market continue in brisk request; and although makers have not up to the present time formally put up their quotations, they are in many cases holding out for slight advances on new contracts. Best Lancashire foundry coke ranges from 22s. to 24s. per ton at the ovens, and furnace qualities from 13s. 6d. to 14s. 6d.

Northern Coal Trade.

There has been a strong demand for coals; but the supply is now an adequate one, and the prices are for some kinds a little easier. In best Northumbrian steam coals, the tendency is, on the whole, a steady one; and the price may be put as from 11s. 4½d. to 11s. 6d. per ton f.o.b. Second-class steam coals are quieter, at from 9s. 6d. to 10s. 6d.; and steam smalls are from 5s. to 5s. 6d. In Durham coals there is now an enlargement of the consumption; but it is still below the average. In the gas coal trade, the demand is now beginning to improve; but there is a fuller supply, and only the best qualities show firmness in price. These are from 9s. 6d. to 10s. per ton f.o.b.; and the other classes are from about 9s. upwards. There are no new contracts of moment to report; but the output of gas coal is already well contracted for. Gas coke is steady; there being a variation in the price from 11s. 6d. to 12s. per ton in the f.o.b. quotations at Newcastle.

Scotch Coal Trade.

There is no change in the coal trade. Stocks are moving off freely; but prices for all sorts remain stationary, with no immediate prospect of rising. The question of the further reduction of the miners' wages, which the masters are asking, is under the consideration of the Conciliation Board. Until it is disposed of, no change in market rates need be looked for. The prices quoted are: Main, 8s. 6d. to 8s. 9d. per ton f.o.b. Glasgow, ell 9s. 6d. to 10s. 3d., and splint 9s. 6d. to 9s. 9d. The shipments for the week amounted to 268,214 tons—an increase of 12,372 tons upon the previous week, and of 49,487 tons upon the corresponding week of last year. For the year to date, the total shipments have been 6,943,536 tons—an increase of 510,726 tons upon the same period of last year.

Carlisle Gas and Water Supply.—The annual accounts of the Carlisle Gas and Water Committee have been audited, and will be brought before a meeting of the Committee to-morrow for adoption, before being submitted to the Council. They show that the year's working has been attended with good results. The water profits amount to over £7000, or £1500 more than last year; and the gas-works accounts show a profit of over £2000, as against a loss last year.

Failure of the Electric Light at Barnsley.—On the night of Saturday, the 23rd ult., about eight o'clock, a mishap at the electric light works caused the greater portion of the principal part of Barnsley to be plunged into darkness. It was the local feast night, and as the majority of the places of business were entirely dependent on electricity as their illuminant, great inconvenience was caused. In some instances the retained gas-fittings could be used again; but in other cases shopkeepers had to fall back upon oil-lamps. The darkness lasted about half-an-hour.

Plucky Workmen and a Narrow Escape.—Shortly after five o'clock last Tuesday, a man named Daniel Butler, employed at the East Greenwich Gas-Works of the South Metropolitan Gas Company, went down a manhole to remove an obstruction; and while engaged in the work he was rendered insensible by an escape of gas. Three men—named Skinner, Cotter, and Hill—descended into the manhole to try and effect a rescue; but they also were overcome by gas fumes. Ultimately the yard foreman succeeded in temporarily stopping the escape from the main; and the four men were brought up in an unconscious condition. After receiving medical attention, the men were able to go to their homes.

Sedgley Gas-Works Extensions.—Last Wednesday, Mr. M. K. North, Assoc.M.Inst.C.E., held an inquiry at the Public Offices, Sedgley, relative to the application of the District Council for sanction to borrow £1120 to carry out an extension of the gas-works. Mr. J. Smith (Clerk to the Council) stated that the population of Sedgley at the last census was 15,961. The rateable value was £34,439, and the outstanding loans amounted to £7290. Mr. J. Bettell (Assistant Manager of the gas-works) stated that the quantity of gas manufactured had increased from 10,913,600 cubic feet in 1885 to 21,289,000 cubic feet last year. It was estimated that during next year it would reach 23,417,900 cubic feet. The daily capacity of the present purifiers was 76,000 cubic feet; and the estimated capacity of the proposed new ones was 182,000 cubic feet per diem. The make of gas during the time of maximum production was 48 per cent. in excess of the capacity of the existing purifiers; while the capacity of the proposed purifiers would be 60 per cent. in excess of the present make during the time of maximum production. Practically the whole of the generating plant required renewing. It was intended to bring the capacity of the works up to a maximum output of 30 million cubic feet per annum. At the close of the evidence, the Inspector remarked that the proposed extentensions were evidently needed. He subsequently visited the works.

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More Welsbach Litigation.—We learn that the Welsbach Incandescent Gas-Light Company, Limited, have lately commenced an action against the Incandescent Trust Company, Limited, for an alleged infringement of their 1893 patent.

Golborne Gas-Works Extensions.—The consumption of gas at Golborne has been growing of late so rapidly that extensive alterations and improvements at the works have become absolutely necessary. Among other things, a holder having a capacity of 109,000 cubic feet is in course of construction by Messrs. R. Dempster and Sons; and four new purifiers on Green's system are being laid down. Between £3000 and £4000 is being spent on the extensions, the carrying out of which is being superintended by the Engineer, Mr. W. H. Worsley.

Cromer Water Supply.—The work of connecting Cromer with its new and more abundant source of water supply at Metton has been recently completed; and the event was celebrated by a dinner given by the Cromer Water Company to the men employed. The contract was entrusted to Messrs. J. E. Kaye and Sons, of Huddersfield, whose special efforts to complete the work—involving continuous labour night and day—were alluded to on the occasion. The son of the Company's Engineer (Mr. H. J. Mellis) and the Clerk of the Works (Mr. T. S. Tilley) were specially thanked for their services. The management of the works is in the hands of Mr. J. K. Frost.

The payment of an interim dividend of 3½ per cent., less tax, has been announced by the Directors of the Tarapaca Water-Works Company, Limited.

Messrs. Kirkham, Hulett, and Chandler, Limited, have received orders from the Redcar Gas Company and the Ascot District Gas Company for patent "Standard" washer-scrubbers for 750,000 and 350,000 cubic feet of gas per day respectively.

Messrs. Clapham Bros., Limited, of Keighley, have received orders for their patent "Eclipse" condensers—one from the Aldershot Gas and Water Company and two from the Devonport Corporation, to be erected at their gas-works. Also for purifiers, with Clapham's patent "Eclipse" joint, from the Elgin Gas Commissioners.

Mr. Maurice Schwab, formerly of Manchester, and for the past four years Manager of the Chemical Engineering Company, and also during the past twelve months a Director of Messrs. Henry Greene and Sons, Limited, has been appointed Managing-Director of the last-named Company. In addition to the business of lighting engineers and contractors, they have now opened a chemical engineering department, which will be under the personal supervision, and in the charge of, Mr. Schwab.

WANTED, FOR SALE, AND CONTRACT ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

SITUATION WANTED.

CLERK. No. 3908.

SITUATIONS VACANT.

STOKERS. Clay Cross Gas-Works.

WORKS FITTER. No. 3907.

EXAMINATIONS IN GAS MANUFACTURE.

TUITION BY CORRESPONDENCE. No. 3909.

BUSINESS FOR DISPOSAL.

HEATING AND COOKING APPARATUS. Denbur, London.

PLANT, &c. (Second-Hand), FOR SALE.

EXHAUSTER AND GASHOLDERS (various). Wright, London.
GASHOLDER, SCRUBBER, EXHAUSTER, &c. Swadlincote.
PHOTOMETER. Charlow and Sacriston Collieries.
PURIFIERS. Mablethorpe Gas-Works.
PURIFIERS, SCRUBBER-WASHERS, GASHOLDERS, &c. Firth Blakeley, Dewsbury.
SCRUBBER. East Grinstead Gas-Works.

PLANT, &c. (Second-Hand), WANTED.

PURIFIERS, ENGINE AND EXHAUSTER, AND WASHER. No. 3905.
PURIFIER. G. Helps, Nuneaton.
TEST HOLDERS. No. 3882.

SALES OF SHARES.

KENT WATER-WORKS. Sept. 16.
PORTSMOUTH WATER COMPANY. Oct. 9.

TENDERS FOR

PIPES.

LEIGH WATER DEPARTMENT. Tenders by Sept. 20.
SWADLINCOTE DISTRICT COUNCIL. Tenders by Sept. 10.

STEEL TROUGHING AND JOISTS.

SWADLINCOTE DISTRICT COUNCIL. Tenders by Sept. 10.

SULPHURIC ACID.

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